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1982
PROGRAM

MONTANA RAIL PLAN

1982 ANNUAL UPDATE

PROGRAM AND DATA DOCUMENTATION

Wilbur Smith and Associates

in association with

MORRISON-MAIERLE, INC.

August, 1982

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TABLE OF CONTENTS

TITLE	PAGE
Table 1 - Rehabilitation Unit Cost Values	1
Table 2 - Land Value Unit Estimates	2
Table 3 - Land Value Estimates	3
Table 4 - Normalized Maintenance of Way and Structures	4
Branch Line Evaluation - Program and Data Description	5
Table 5 - Carload Cost Scales Adjustments for Inflation	7
Table 6 - Truck Operating Costs and Commodity Transfer Costs	8
Efficiency Benefits - Program Description	10
Benefit/Cost - Program Description	12
Branch Line Evaluation - Program Control	15
Data Input Sequence	16
Table 7 - Commodity Codes	20
Table 8 - Car Type Codes	21
Coded Example	22
Example Interactive Run	24
Sample Data File	31
Example Batch Run	32
Efficiency Benefit - Program Control	37
Data Input Sequence	38
Coded Example	40
Example Interactive Run	41
Sample Data File	43
Example Batch Run	44
Benefit/Cost - Program Control	46
Data Input Sequence - Interactive Mode	47
Data Input Sequence - Batch Mode	51
Coded Example	55

TABLE OF CONTENTS

TITLE	PAGE
Example Interactive Run	57
Sample Data File	61
Example Batch Run	62
Blank Forms	
Branch Line Evaluation (Computer)	65
Efficiency Benefits (Computer)	67
Benefit/Cost (Computer)	68
Off-Branch Costs (Manual)	70

Table 1

REHABILITATION UNIT

COST VALUES

Montana Rail Plan

1982 Update

COST ITEM	UNIT	COST/UNIT
Materials		
Rail, 100 lb., Relay	Ton	$ 275.00
Rail, 90 lb., Relay	Ton	175.00
Joints, 100 lb., Second Hand	Pair	10.00
Joints, 90 lb., Second Hand	Pair	6.00
Joints, 85 lb., Second Hand	Pair	5.00
Bolts and Nutlocks, 100 lb. Joints, New	Each	2.00
Bolts and Nutlocks, 90 lb. Joints, New	Each	1.75
Tie Plates, 100 lb., Second Hand	Each	2.75
Tie Plates, 90 lb., Second Hand	Each	1.50
Spikes, New	Each	0.36
Rail Anchors, 85, 90, or 100 lb., New	Each	1.15
Turnouts, 100 lb., Second Hand	Each	10,000.00
Crossties, New	Each	17.00
Ballast	Ton	3.75
Labor, Equipment Charges		
Lay Rail	Mile	15,000.00
Rail End Welding	Day	400.00
Timber and Surface (1,000 ties/mile)	Mile	10,000.00
Timber and Surface (800 ties/mile	Mile	8,000.00
Timber and Surface (700 ties/mile)	Mile	7,000.00
Timber and Surface (600 ties/mile)	Mile	6,600.00
Timber and Surface (400 ties/mile)	Mile	4,400.00
Surface and Line	Mile	2,500.00
Smooth and Line	Mile	1,250.00
Unload Material (Rail, Joints, Ties, Bolts, Nutlocks, Tie Plates, Spikes, Anchors, Ballast)		
Unload Material (Ballast, Ties, Spikes)	Mile	1,500.00
Work Road Crossings	Each	2,000.00
Apply Rail Anchors	Mile	800.00
Install Tie Plates and Anchors	Mile	1,400.00
Install Joints and Anchors	Mile	1,000.00
Install Turnouts	Each	3,000.00
Ditching and Roadbed Repair	Mile	1,000.00
		-5,000.00
Roadbed Repair, Rip Rap	Lump	500.00
Clean Cuts	Mile	2,000.00
Clean Ditches	Mile	1,000.00
Cut Brush	Mile	500.00

Table 2

LAND VALUE UNIT ESTIMATES

Montana Rail Plan

1982 Update

LAND USE	COST/ACRE		
	General	Colstrip Area	Western
Dry Land Farming	$ 300-400	$ 500-700	-
Irrigated Farming	1,000-1,500	-	-
Home Sites	1,500-2,500	6,000-8,000	-
Grazing	150-200	200-250	200

SOURCE: Montana Department of Highways

Table 3

LAND VALUE ESTIMATES

Montana Rail Plan

1982 Update

LINE	LENGTH	ACRES (1)	VALUE/ ACRE	VALUE (2)
Bainville/Scobey	100.0	1,212	$ 400	$485,000
Scobey/Opheim	46.8	565	400	226,000
Big Sandy/Fort Benton	40.8	494	1,250	618,000
Brazil Creek Spur	18.7	227	145	33,000
Butte/Whitehall	28.8	349	100	35,000
Circle/Brockway	10.5	127	350	45,000
Columbia Falls/Somers	24.9	302	325	99,000
Dixon/Polson	33.4	405	1,000	405,000
Drummond/Philipsburg	26.2	318	400	126,000
Durant/Anaconda	12.0	145	400	58,000
Anaconda/Brown	6.2	75	300	23,000
Fromberg/Bridger	6.1	74	200	15,000
Glendive/Circle	53.7	651	350	228,000
Lavin Spur	4.4	53	300	16,000
Manhattan/Anceney	15.2	184	250	46,000
Mission/Wilsall	22.9	278	250	69,000
Montana City/Basin	33.6	407	150	61,000
Newlon Jct./Richey	45.4	550	350	193,000
North Dakota State Line/ Whitetail	56.9	690	400	276,000
Phosphate Spur	3.6	44	130	6,000
Stryker/Eureka	23.2	281	200	57,000
Three Forks/Whitehall	31.4	381	300	114,000
Valier Jct./Valier	17.2	208	1,250	261,000

(1) Average of 100 foot right-of-way; 12.12 acres/mile

(2) Rounded

SOURCE: Montana Department of Highways

Table 4

NORMALIZED MAINTENANCE
OF WAY AND STRUCTURES

Montana Rail Plan
1982 Update

LINE	LENGTH	NUMBER OF CROSSINGS	LINEAR FEET OF BRIDGES	ANNUAL COST/MILE				ANNUAL COST
				Base	Crossing(1)	Bridges(2)	Total	
Bainville/Scobey	100.0	62	7,300	$6,000	$ 62	$1,460	$7,522	$752,200
Scobey/Opheim	46.6	22	2,467	6,000	47	1,059	7,106	329,708
Brazil Creek Spur	18.7	3	300	6,000	16	321	6,337	118,502
Butte/Whitehall	28.8	5	1,800	6,000	17	1,250	7,267	209,290
Circle/Brockway	10.5	2	1,524	6,000	19	1,524	7,543	79,202
Columbia Falls/Somers	24.9	26	650	6,000	104	522	6,626	164,987
Dixon/Polson	33.4	26	668	6,000	78	400	6,478	216,365
Drummond/Philipsburg	26.2	9	643	6,000	34	491	6,525	170,955
Durant/Brown	18.2	12	(3)	6,000	66	(1)	6,066	110,401
Fromberg/Bridger	6.1	6	150	6,000	98	492	6,590	40,199
Glenaive/Circle	53.7	11	2,432	6,000	20	906	6,926	371,926
Lavin Spur	4.4	3	110	6,000	68	500	6,568	28,899
Manhattan/Anceney	15.2	9	1,060	6,000	59	1,395	7,454	113,301
Mission/Wilsall	22.9	19	1,930	6,000	83	1,686	7,769	177,910
Montana City/Basin	33.6	8	1,940	6,000	24	1,155	7,179	241,214
Newlon Jct./Richey	45.4	13	1,960	6,000	29	4,450	7,989	362,701
North Dakota State Line/Whitetail	56.9	20	600	6,000	35	211	6,246	355,397
Phosphate Spur	3.6	1	100	6,000	28	556	6,584	23,702
Stryker/Eureka	23.2	5	740	6,000	21	638	6,659	154,489
Three Forks/Whitehall	31.4	7	990	6,000	22	631	6,653	208,904
Valier Jct./Valier	17.2	14	240	6,000	81	279	6,360	109,392

(1) $100/crossing divided by length of line.
(2) $20/linear foot divided by length of line.
(3) Not available.

BRANCH LINE EVALUATION

Program and Data Description

This program calculates the estimated annual on-branch cost to operate a branch line. In addition, it estimates the railroad user cost to truck to and from an alternate station.

General Description

This program calculates railroad and rail customer alternate costs by station and then calculates line-specific costs. Costs are summarized and compared to user-provided revenue data.

Railroad Costs - Railroad unit cost data are obtained from a publication of the Interstate Commerce Commission and are updated with an inflation factor provided by the Commission. These data are regional averages based on the principal railroads in the region. For the 1982 Update of the Montana Rail Plan, Region VI was used since the Burlington Northern is in that region. Costs that were used for this Update are presented in Table 5. These unit costs are read in from a terminal or from a previously created file.

Truck Costs - Truck line haul and handling unit costs are contained in a Block Data subroutine. These unit costs are used to estimate the rail user impact of lost rail service by a calculating trucking line-haul and handling costs. The program allows a 2-parameter function for line haul costs. These costs are by commodity group and can be a function of both tons and ton-miles. (The function for the Montana Rail Plan Update was on only a ton-mile basis.) Similarly, transfer costs are also on a per ton basis by commodity group. Table 6 contains the costs used in the 1982 Update.

As discussed above, the truck line haul and handling costs are contained in the program. However, they can be changed in 2 ways. First, new data for all commodities can be re-compiled with the program. The second method can be used to change data for particular commodities at program execution time.

Program Outline

This program can be operated either interactively or in a batch mode. In the interactive mode, the user enters data in response to program prompts written on the terminal. The program then calculates various costs and statistics and creates a disk file that can be used at another time. In the batch mode, the

program reads all input data from a previously created file after the user indicates to the program that such a file exists. The following is a brief description of the major steps of the program once the data are read in.

1. A loop is set up and Steps 2-15 are performed for each station.
2. Number of cars by type are determined and accumulated (up to 5 commodities per station).
3. Net tons for each commodity are determined.
4. Tare (empty) weights for each type of car are determined.
5. Total gross tons, gross ton-miles and gross ton-mile costs are determined and accumulated.
6. Names of each car type are stored for printing.
7. Station data and gross ton-mile costs are printed.
8. Car-mile costs by car type are determined and accumulated.
9. Another loop is set up and Steps 10-15 are performed only for stations for which an alternate station highway distance has been entered.
10. Truck ton-miles by commodity are determined and accumulated.
11. Truck line haul and handling costs are determined and accumulated.
12. Number of one-way truck trips are determined.
13. Names of commodities are stored for printing.
14. Truck data and costs are printed.
15. New track, platform, and bulk facility costs are annualized at 16% and then printed.
16. After Steps 2-15 are performed for each station, accumulated gross ton-mile costs are printed.
17. Locomotive costs are determined and printed.
18. Wage and other train-mile costs are determined and printed.
19. Cars are classified by type, and switch costs are determined and printed.
20. Cars are classified by type and car day costs are determined and printed.
21. Maintenance of way costs are determined and printed.
22. Land and track material annual returns are calculated and printed.
23. All costs are totalled and compared with annual revenues.
24. Total shipper cost is printed.
25. Total cars per mile and million gross ton-miles per mile are determined and printed.

TABLE 5

CARLOAD COST SCALES

ADJUSTMENTS FOR INFLATION

REGION VI

COST ITEM	SOURCE (1)	1977	Jan. 1981 (2)
		(dollars)	
Transportation			
Expense/Gross Ton-Mile	App. E, L1	.00186	.00258
Locomotive Expense/ Unit-Mile	App. E, L4	1.12981	1.56592
Wages & Other Expense/ Train-Mile	App. E, L7+L8	6.39445	8.86271
Switch Expense/Car			
Box	Table 10, L10	36.76	50.95
All Other, Except Flat	Table 10, L12	40.85	56.62
Flat	Table 10, L11	31.17	43.20
Car Cost			
Cost/Car-Mile	Table 3:		
Box-Unequipped	L49	.1099141	.1523409
Box-Equipped	L50	.1139600	.1579486
Gondola-General	L52	.1234005	.1710331
Open Hopper-General	L54	.1375612	.1906598
Covered Hopper	L56	.1348639	.1869214
Flat-General	L58	.1267721	.1757061
Cost/Car-Day	Table 11:	31.58	43.77
Box-Unequipped	L4	31.58	43.77
Box-Equipped	L5	33.24	46.07
All Other	L6		
Special Service	Table 9,L7	10.10	14.00

(1) Rail Carload Cost Scales, 1977, Statement No. 1c1-77, Interstate Commerce Commission, Bureau of Accounts

(2) Factor for January, 1981, Region VI - 1.386

Table 6

TRUCK OPERATING COSTS
AND COMMODITY TRANSFER COSTS

CODE	COMMODITY	TRAILER TYPE	PAYLOAD	UTILIZATION FACTOR	OPERATING Cost/Mile	OPERATING Cost/Ton Mile	LOADING/ UNLOADING METHOD	TRANSFER TIME	TRANSFER COST/ HOUR	TRANSFER COST/ TON
01	Grain	Grain	30.5	.8	$ 1.015(1)	$ .04164(1)	-	-	-	$ 2.47
08	Forest Products	Wood	18.9	.5	1.10	.11640	Fork	2.00	16.89	1.787
09	Marine Products	Reefer	18.9	.8	1.23	.08135	Fork	2.00	16.89	1.787
10	Metallic Ores	Bottom Hopper	22.0	.5	1.15	.10455	Gravity	2.00	9.00	.818
11	Coal	Bottom Hopper	22.0	.5	1.15	.10455	Gravity	2.00	9.00	.818
13	Crude Petroleum, Natural Gas	Tank	21.6	.5	1.50	.13889	Pump	1.50	9.00	.625
14	Nonmetallic Minerals	Bottom Hopper	24.0	.5	1.15	.09583	Gravity	2.00	9.00	.750
19	Ordnance	Van	13.5	.8	1.10	.10185	Fork	2.00	16.89	2.502
20	Food and Kindred Products	Van	19.6	.8	1.10	.07015	Fork	2.00	16.89	1.723
21	Tobacco Products	Van	18.0	.8	1.10	.07639	Fork	2.00	16.89	1.877
22	Textile Mill Products	Van	19.8	.8	1.10	.06944	Fork	2.00	16.89	1.706
23	Apparel	Van	19.8	.8	1.10	.06944	Fork	2.00	16.89	1.706
24	Lumber and Wood Products	Flat	18.9	.5	1.22	.12910	Fork	2.00	16.89	1.787
25	Furniture and Fixtures	Van	11.3	.8	1.10	.12168	Labor	3.50	9.00	2.788
26	Pulp, Paper, and Allied Products	Van	19.8	.8	1.10	.06944	Fork	2.00	16.89	1.706
27	Printed Matter	Van	19.8	.8	1.10	.06944	Fork	2.00	16.89	1.706
28	Chemicals and Allied Products	Van	21.6	.8	1.10	.06366	Fork	2.00	16.89	1.564
29	Petroleum and Coal Products	Tank	20.1	.5	1.50	.14925	Pump	1.62	9.00	.725
30	Rubber and Miscellaneous Plastic	Van	15.8	.8	1.10	.08703	Fork	2.00	16.89	2.138
31	Leather and Leather Products	Van	19.8	.8	1.10	.06944	Fork	2.00	16.89	1.706
32	Stone, Clay, Glass, Concrete Products	Flat	22.5	.5	1.22	.10844	Fork	2.00	16.89	1.501
33	Primary Metal Products	Flat	19.8	.5	1.22	.12323	Fork	2.00	16.89	1.706
34	Fabricated Metal Products	Flat	19.8	.5	1.22	.12323	Fork	2.00	16.89	1.706

Table 6

TRUCK OPERATING COSTS
AND COMMODITY TRANSFER COSTS
(Continued)

CODE	COMMODITY	TRAILER TYPE	PAYLOAD	UTILI-ZATION FACTOR	OPERATING Cost/Mile	OPERATING Cost/Ton Mile	LOADING/ UNLOADING METHOD	TRANSFER TIME	TRANSFER COST/ HOUR	TRANSFER COST/ TON
35	Machinery Except Electrical	Flat	13.5	.5	1.22	.18074	Labor	4.75	9.00	3.167
36	Electrical Machinery, Equipment	Van	18.9	.8	1.10	.07275	Fork	2.00	16.89	1.787
37	Transportation Equipment	Flat	3.7	.5	1.22	.65946	Labor	1.33	9.00	3.235
38	Instruments	Van	13.5	.8	1.10	.10185	Fork	2.00	16.89	2.502
39	Miscellaneous Products of Manufacturing	Van	13.5	.8	1.10	.10185	Fork	2.00	16.89	2.502
40	Waste and Scrap	Dump	19.8	.5	1.15	.11616	Gravity	1.00	9.00	.667
41	Miscellaneous Freight	Van	13.5	.8	1.10	.10185	Labor	6.00	9.00	4.00
42	Containers, Shipping, Returned Empty	Van	6.8	.8	1.10	.20221	Labor	3.00	9.00	3.971
43	Mail	Van	13.5	.8	1.10	.10185	Labor	6.00	9.00	4.000
44	Freight Forwarder	Van	13.5	.8	1.10	.10185	Labor	6.00	9.00	4.000
45	Shipper Association or Similar	Van	13.5	.8	1.10	.10185	Labor	6.00	9.00	4.000
46	Miscellaneous Mixed Shipments	Van	13.5	.8	1.10	.10185	Labor	6.00	9.00	4.000
47	Small Packaged Freight Shipments	Van	13.5	.8	1.10	.10185	Labor	6.00	9.00	4.000
49	Hazardous Material	Tank	21.6	.5	1.50	.13889	Pump	3.00	9.00	1.250
51	Grain	Farm Truck	12.8	.5	.748	.1169	-	-	-	2.970
52	Wood Chips	Hopper	25.0	.5	1.20	.0960	Gravity	2.50	9.00	.900
53	Liquid Fertilizer	Tank	21.6	.5	1.50	.13889	Pump	1.50	9.00	.625
54	Dry Fertilizer	Bottom Hopper	22.0	.5	1.15	.10455	Gravity	2.00	9.00	.818
55	Insulation	Van	10.0	.5	1.10	.2200	Labor	4.00	9.00	3.600
C1	C2	C3	C4	C5	C6	C7=C6/(C4x C5)	C8	C9	C10	C11=C9x C10/C4

(1) Grain Subterminal Study, p. A-19, $1.27/loaded mile, 80% utilization.

SOURCE: (1) Private Fleet Cost Index, Private Truck Council of America, prepared by Kearney Management Consultants, April, 1982.
(2) An Economic Analysis of Upgrading Rail Branch Lines: A study of 71 lines in Iowa, C. H. Baumel, et al., Iowa Department of Transportation and Iowa State University, for Federal Railroad Administration, March 1976.

EFFICIENCY BENEFITS

Program Description

This program calculates the economic efficiency benefits of rail projects in comparison to the cost of transport if the project were not implemented and events proceeded without intervention. It's primary use in rail planning work is to test the effects of abandonment with alternatives that would prevent the abandonment.

General Description

This program applies the following formula(1) to calculate efficiency benefits:

$$(B1-B0) = Q0(C0-C1) + 0.5(P0-P1)(Q1-Q0) + (P1-C1)(Q1-Q0)$$

where (B1-B0) = Change in efficiency benefits from Alternative 1 over Alternative 0.
Q0-Q1 = Quantity moved before and after alternative is implemented.
C0,C1 = Gross cost per ton to move the traffic before and after alternative is implemented.
P0,P1 = Price per ton to move the traffic before and after alternative is implemented.

As shown, the above formula has 3 terms:

Q0(C0-C1) = Cost change on existing traffic
0.5(P0-P1)(Q1-Q0) = Consumer surplus on new traffic
(P1-C1)(Q1-Q0) = Producer surplus on new traffic

The first term is a function of the difference in economic costs at the present level of traffic. The second term is a function of the difference in price paid by the user, but is applied only to the change in traffic level. The last term is a function of the difference between price and cost to the transportation suppliers, but it is also applied only to the change in traffic level(2).

Program Outline

The program applies the previously discussed formula for an initial period (before project implementation) and a subsequent period (after project implementation). The program can be run

interactively or in a batch mode. The following is a brief description of the program once the data are read in:

1. The initial cost reduction on existing traffic is calculated using the unit cost before and after project implementation.
2. The initial consumer surplus on new traffic is calculated using the unit cost before and after project implementation.
3. The initial producer surplus on new traffic is calculated using unit price and cost of alternative project.
4. These data and all input data are printed.
5. The subsequent period benefits are then calculated. These benefits are based on assumption that without the project, the traffic level will not change and that the normal oourse of events will occur. (For most projects the "do nothing" option is presumed to result in eventual abandonment).
6. The subsequent cost reduction on existing traffic is calculated using the cost after project implementation and the cost if the alternative is not implemented (e.g. abandonment).
7. The subsequent consumer surplus on new traffic is calculated using the price before and after project implementation and the cost if the alternative is not implemented.
8. The subsequent producer surplus on new traffic is calculated using unit price and cost of alternative project.
9. These data are printed.

FOOTNOTES

(1) Benefit-Cost Guidelines - Rail Branch Line Continuation Program, Federal Railroad Administration, Washington, D.C., February, 1980.

(2) If the level of traffic does not change after project implementation, then only the first term will be non-zero since the other two terms contain the factor, Q0-Q1. For this reason, this program was not actually used for the 1982 Update of the Montana Rail Plan since no traffic change assumptions were made. The first term is simply the difference in total transport costs with and without the alternative project. However, the program and documentation have been provided for later analyses as necessary.

BENEFIT/COST

Program Description

This program determines the present value of a stream of project benefits and costs by discounting the constant dollar values with user-provided discount rates. Once the present values of the benefits and costs are calculated, the program calculates the net present value (benefits minus costs) and the benefit/cost ratio (benefits divided by costs).

Several user options are available. The program may be directed to calculate intermediate year costs and/or benefits by interpolating between reference year values. A compound annual growth rate is used for this calculation. This feature can also be used to enter a cost and/or benefit which is constant over time by entering the same value at the beginning and end of a period. A second option allows the user to test sensitivities by applying factors to existing cost or benefit components. A third option allows the user to obtain the internal rate of return (the discount rate at which the net present value equals zero). The internal rate of return calculation is an iteractive procedure which can add significantly to the program execution time. For this reason, this calculation is optional. A fourth option allows the evaluation of entirely different costs and benefits within a single execution of the program. Finally, the user can enter up to 4 different benefit streams.

In rare cases, no internal rate of return solution exists. The program identifies these cases and reports the discount rate at which the net present value is closest to zero. In cases where undiscounted costs exceed benefits, a negative internal rate of return will result. No calculation is possible in cases where benefits exceed costs (or vice versa) in all analysis years.

Program Outline

This program can be operated either interactively or in a batch mode. In the interactive mode, the user enters data in response to program prompts written on the terminal. The program then calculates the present value of benefits and costs, the net present value, and the benefit/cost ratio for all user-provided discount rates. Then at the user's option, the program calculates the internal rate of return. Finally, the entire procedure is repeated for each set of benefits and costs that the user enters. All input data from an interactive execution of this program are written on a disk file for possible later use. In the

batch mode, the user indicates the existence of a previously created file, and the program then calculates the same information as in the interactive mode. The following is a brief description of the major steps of the program once the data are read in:

1. The cost, benefit, interpolation, and factor arrays are initialized to zero.

2. Non-zero cost and benefit values are stored in separate arrays.

3. Factors are applied to each cost and benefit stream if required.

4. A loop is set up, and intermediate cost and benefit values are interpolated if the interpolation option has been selected. A compound annual growth rate is used.

5. A loop is set up and total undiscounted benefits are calculated for each year.

6. A loop is set up and the present value of costs and the total benefits are calculated for each year. The total present value of costs and benefits, the net present values and the benefit/cost ratio are then calculated. Relevant information is printed. This step is repeated until all user-provided discount rates are used.

7. The user is then asked on the terminal whether or not the internal rate of return calculation is required. If it is not required, the program then asks if there are any more analyses. If more analyses are requird, the program terminates. If the internal rate of return is required, the program proceeds to Step 8.

8. A loop is et up and the difference between costs and to full benefits are calculated for every year.

9. A test is performed to determine whether benefits are always greater than or equal to costs or vice versa. If either case is true, then a message is written and the program asks for any additional analyses.

10. Loops are set up and the first and second derivatives of the net present value curve are calculated for a test discount rate (initially 1.0).

11. A new discount rate is determined based on the previously-used rate and the derivatives of the function are calculated.

12. A test is made of the difference between the present rate and the previously used rate. If the two rates in percent are within 0.1 of each other, the internal rate of return value has been determined and the program prints the results and then asks for more analyses. If the difference between the rates is greater than this value, the program returns to Step 10. This procedure continues until a solution is found or the second derivative of the function equals zero. If the second derivative of the net present value curve is zero, the curve changes direction at that point and no true solution exists. The rate at this minimum point is then printed, and the program asks for more analyses.

BRANCH LINE EVALUATION

Program Control

Program Name

BRANCH

Abstract

Annual on-branch rail costs are calculated using regional average rail unit costs and branch-specific data. By option, rail user truck and handling costs to alternate rail stations are also calculated.

Input

1. Interactive mode:
   Lu 1: All unit costs and branch-specific data are read from a terminal in response to program-generated prompts.
2. Batch mode
   Lu 8: All data from a previously-created file are read from disk.

Disk Output

Lu 8: All input data only if data are entered from terminal.

Printed Output

The program lists the following:

1. For each station, expenses per gross ton-mile, expenses per car mile, and shipper costs to an alternate station.

2. After all stations have been run, a summary of station costs, locomotive cost, wage cost, switch cost, car day cost, special service car cost, maintenance of way cost, and return on value. Program then calculates profit or loss and total shipper alternate cost.

BRANCH LINE EVALUATION PROGRAM

DATA INPUT SEQUENCE

RECORD TYPE	NUMBER OF RECORDS	RECORD COLUMN INFORMATION				REMARKS
		Column	FORTRAN Format	Field Contents	Units	
Title	1	1-80	20A4	Any alphanumeric characters		Use for branch name, run date etc.
Year/Railroad	1	1-4	I4	Year		Year of data.
		5-80	19A4	Any alphanumeric characters		Railroad company name.
Unit Costs-1	1	1-8	F8.6	Gross ton-mile cost	$/Gross Ton-Mile	Obtain data for this record and next 2 records from ICC publication Rail Carload Cost Scales.
		9-16	F8.2	Special service cost	$/Car	
		17-24	F8.5	Locomotive cost	$/Locomotive-Mile	
		25-32	F8.5	Train cost	$/Train-Mile	
Unit Costs-2	1			Car-mile costs:	$/Car-Mile	
		1-8	F8.6	Box-unequipped		
		9-16	F8.6	Box-equipped		
		17-24	F8.6	Gondola		
		25-32	F8.6	Open hopper		
		33-40	F8.6	Covered hopper		
		41-48	F8.6	Flat		
		49-56	F8.6	Tank		
Unit Costs-3	1			Car-day costs:	$/Car-Day	
		1-8	F8.4	Box-unequipped		
		9-16	F8.4	Box-equipped		
		17-24	F8.4	All other		
				Switch costs:		
		25-32	F8.4	Box	$/Car	
		33-40	F8.4	Other except flat		
		41-48	F8.4	Flat		

DATA INPUT SEQUENCE
(Continued)

RECORD TYPE	NUMBER OF RECORDS	RECORD COLUMN INFORMATION				
		Column	FORTRAN Format	Field Contents	Units	REMARKS
Branch-Specific Cost and Revenue	1	1-8	F8.2	Maintenance of way and structures	$/Mile	Actual cost or normalized value.
		9-16	F8.2	Value of right-of-way	$/Mile	Average per acre based on 100 ft. right-of-way (12.12 acres/mile).
		17-24	F8.0	Value of track materials	$	Estimated net liquidation value.
		25-32	F8.2	Railroad rate of return-cost of capital	%	
		33-40	F8.0	Annual gross revenue	$	Actual or estimated, (only revenue received by this railroad).
		41-48	F8.0	Annual off-branch cost	$	Actual or estimated.
Other Branch Specific Data	1	1-8	F8.3	Line length	Miles	
		9-16	F8.3	Number of locomotives	Units/Train	
		17-24	F8.2	Locomotive weight	Tons/Unit	
		25-32	F8.3	Number of train trips	Average Round Trips/Week	
		36-40	I5	Number of stations		See record following next record.
		44-48	I5	Number of truck cost changes		See next record.

BRANCH LINE EVALUATION PROGRAM

DATA INPUT SEQUENCE
(Continued)

RECORD TYPE	NUMBER OF RECORDS	RECORD COLUMN INFORMATION				
		Column	FORTRAN Format	Field Contents	Units	REMARKS
Truck Cost Changes (Optional)	Up to 99	1-8	I8	Commodity code	Valid Values: 1-99	Total number of truck change records must be placed in fields 44-48 of previous record. Enter 0 if no changes required. All data for a commodity must be entered even if only part is being changed.
		9-16	2A4	Commodity name	Any alphanumeric characters	
		17-24	F8.4	Truck cost	$/ton	
		25-32	F8.4	Truck cost	$/ton-mile	
		33-40	F8.4	Transfer cost	$/ton	
		41-48	F8.4	Payload	Tons	
Repeat following 5 records for each station. Number of sets of station data must be entered in fields 36-40 of "Other Branch-Specific Data."						
Station Data-1	1	1-80	20A4	Any alphanumeric data.		Station name and name of alternative to this station. For batch mode run from previously created file, format is I8, 20A4. Enter any integer (dummy value) in Column 8.

BRANCH LINE EVALUATION PROGRAM

DATA INPUT SEQUENCE
(Continued)

RECORD TYPE	NUMBER OF RECORDS	RECORD COLUMN INFORMATION				REMARKS
		Column	FORTRAN Format	Field Contents	Units	
Station Data-2	1	1-8	F8.2	Rail distance from main line station	Miles	
		9-16	F8.2	Highway distance to alternate station	Miles	Optional-Program calculates truck costs only if a value is entered.
		17-24	F8.0	New siding cost	$	If included, program calculates annualized cost for these three values.
		25-32	F8.0	New loading platform cost	$	
		33-40	F8.0	New bulk facility cost	$	
Station Data-3	1	1-8	I8	1st commodity code	Valid values:1-99	See list of commodity codes. Up to 5 allowed.
		9-16	I8	2nd commodity code		
		17-24	I8	3rd commodity code		
		25-32	I8	4th commodity code		
		33-40	I8	5th commodity code		
Station Data-4	1	1-2	I2	1st car type code	Valid values:1-7	See list of car type codes.
		3-6	I6	1st number of cars		
		7-8	I2	2nd car type code		
		9-16	I6	2nd number of cars		
		17-18	I2	3rd car type code		
		19-24	I6	3rd number of cars		
		25-26	I2	4th car type code		
		27-32	I6	4th number of cars		
		33-34	I2	5th car type code		
		35-40	I6	5th number of cars		
Station Data-5		1-8	F8.2	1st car payload	Tons of freight/ car	Use actual or estimated average annual payload.
		9-16	F8.2	2nd car payload		
		17-24	F8.2	3rd car payload		
		25-32	F8.2	4th car payload		
		33-40	F8.2	5th car payload		

Table 7

COMMODITY CODES

Branch Line Evaluation Program

COMMODITY CODE (1)	COMMODITY GROUP
01	Farm Products - Grain by Grain Truck
08	Forest Products
09	Marine Products
10	Metallic Ores
11	Coal
13	Crude Petroleum, Natural Gas
14	Nonmetallic Minerals
19	Ordnance
20	Food and Kindred Products
21	Tobacco Products
22	Textile Mill Products
23	Apparel
24	Lumber and Wood Products
25	Furniture and Fixtures
26	Pulp, Paper and Allied Products
27	Printed Matter
28	Chemicals and Allied Products
29	Petroleum and Coal Products
30	Rubber and Miscellaneous Plastic Products
31	Leather and Leather Products
32	Stone, Clay, Glass and Concrete Products
33	Primary Metal Products
34	Fabricated Metal Products
35	Machinery, Except Electrical
36	Electrical Machinery, Equipment and Supplies
37	Transportation Equipment
38	Instruments
39	Miscellaneous Products of Manufacturing
40	Waste and Scrap Materials
41	Miscellaneous Freight
42	Containers, shipping, returned empty
43	Mail
44	Freight Forwarder
45	Shipper Association or Similar Traffic
46	Miscellaneous Mixed Shipments
47	Small Packaged Freight Shipments
49	Hazardous Material
51	Grain by Farm Truck
52	Wood Chips
53	Liquid Fertilizer
54	Dry Fertilizer
55	Insulation

(1) Codes through 49 correspond to 2-digit level of Standard Transportation Commodity Code (STCC).

Table 8

CAR TYPE CODES

Branch Line Evaluation Program

CODE	CAR TYPE
1	Box - Unequipped
2	Box - Equipped
3	Gondola
4	Open Hopper
5	Covered Hopper
6	Flat
7	Tank

BRANCH LINE EVALUATION PROGRAM

Line : Mountain Jct. to Valley

Date : 7/13/82

Line Name							
MOUNTAIN JUNCTION TO VALLEY - EXAMPLE RUN - 7/13/82							
Year	Railroad Name						
1980	UNION NORTHERN						
Cost / Gross Ton - Mile	Special Service Cost/Car	Loco Cost / Unit - Mile	Cost/ Train - Mile				
.002580	14.000	1.56592	8.86271				
Car-Mile Cost Box-Uneq.	Car-Mile Cost Box-Eq.	Car-Mile Cost Gondola	Car-Mile Cost Open Hopper	Car-Mile Cost Cov. Hopper	Car-Mile Cost Flat	Car-Mile Cost Tank	
.152341	.157949	.171033	.190660	.186921	.175806	.150000	
Car-Day Cost Box-Uneq.	Car-Day Cost Box-Eq.	Car-Day Cost All Other	Switch Cost Box	Switch Cost Other Ex-cept Flat	Switch Cost Flat		
43.7700	43.7700	46.0700	50.9500	56.9200	43.2000		
Maintenance Cost/Mile	Land Value / Mile	Net Value of Materials	Rate of Return - %	Annual Gross Revenue	Annual Off Branch Cost		
6360.00	51744.42	172000.	12.10	3583580.	834661.		
Line Length	Number of Locos.	Tons / Loco	Trains / Week	Number of Stations	Number of Truck Changes		
17.200	2.000	125.00	2.000	3	1		
Commodity Code	Commodity Name	Truck Cost / Ton	Truck Cost / Ton-Mile	Transfer Cost / Ton	Truck Payload	Optional - Use only if columns 33-40 of previous line have a value. Up to 99 changes allowed	
56	POP	0.0000	.0769	3.0000	10.4000		

BRANCH LINE EVALUATION PROGRAM

Line : Mountain Jct. to Valley

Date : 7/13/82

Repeat these five lines for each station

Station Name											
Rail Distance from Junction		Highway Distance to Alt. Station		New Siding Cost		New Platform Cost		New Bulk Facility Cost			
Commodity Code 1		Commodity Code 2		Commodity Code 3		Commodity Code 4		Commodity Code 5			
Car TR-1	Number of Cars-1	Car TR-2	Number of Cars-2	Car TR-3	Number of Cars-3	Car TR-4	Number of Cars-4	Car TR-5	Number of Cars-5		
Tons/Car Commodity 1		Tons/Car Commodity 2		Tons/Car Commodity 3		Tons/Car Commodity 4		Tons/Car Commodity 5			
HILL - ALTERNATE STATION - PLAINTOWN											
	7.00		35.00		0.		0.		0.		
	1		24		51		54		56		
5	135	6	4	5	66	5	77	2	25		
	89.35		43.10		89.35		90.00		40.00		
VALLEY - ALTERNATE - TRUCK TO LEWISTON FOR BARGE											
	17.20		594.00		0.		0.		0.		
	1										
5	202										
	89.35										
VALLEY - NO ALTERNATE - BUSINESS CLOSES											
	17.20		0.00		0.		0.		0.		
	24										
6	80										
	43.10										

```
BRANCH

ARE YOU GOING TO USE AN EXISTING INPUT FILE? (YES OR NO)
NO

ENTER FOLLOWING LINES OF DATA:
LINE 1    : BRANCH LINE NAME
LINE 2    : YEAR OF DATA AND RAILROAD NAME
LINES 3-5  : 3 LINES OF UNIT COST DATA
LINE 6     : BRANCH-SPECIFIC COST AND REVENUE DATA
LINE 7     : OTHER BRANCH-SPECIFIC DATA
MOUNTAIN JUNCTION TO VALLEY - EXAMELE RUN - 7/13/82
1980UNION NOERTHERN
 .002580   14.00 1.56592 8.86271
 .152341 .157949 .171033 .190660 .186921 .175806 .150000
 43.7700 43.7700 46.0700 50.9500 56.9200 43.2000
 6360.0015174.42 172000.  12.103583580. 834661.
  17.200   2.000  125.00  2.000    3       1

YOU HAVE CHOSEN TO MAKE CHANGES TO  1 COMMODITIES FOR TRUCK COSTING
ENTER FOLLOWING (1 LINE PER COMMODITY)
2-DIGIT CODE, NAME, COST/TON, COST/TON MILE, TRANSFER COST/TON,AND PAYLOAD

ENTER DATA FOR CHANGE  1
      56   POP    0.0000   .0769  3.0000 10.4000

ENTER FOLLOWING LINES OF DATA FOR STATION  1:
LINE 1: NAME OF STATION
LINE 2: RAIL DISTANCE FROM JUNCTION TO THIS STATION,
        AND ALTERNATE FACILITY COSTS
LINE 3: COMMODITY CODES (UP TO 5)
LINE 4: CAR TYPE AND NUMBER OF CARLOADS FOR EACH COMMODITY
LINE 5: FREIGHT TONS PER CAR FOR EACH COMMODITY
HILL - ALTERNATE STATION - PLAINTOWN
    7.00   35.00      0.      0.     0.
       1      24      51      54     56
 5   135 6     4 5    66 5    77 2    25
   89.35   43.10   89.35   90.00  40.00
```

Terminal

LINE - MOUNTAIN JUNCTION TO VALLEY - EXAMPLE RUN - 7/13/82
RAILROAD - UNION NORTHERN
YEAR - 1980

STATION - HILL - ALTERNATE STATION - PLAINTOWN

EXPENSE PER GROSS TON MILE

	COMMODITY TYPE 1	2	3	4	5	TOTAL
1 COMMODITY TYPE	1	24	51	54	56	
2 NUMBER OF CARS	135	4	66	77	25	307
3 NET TONS PER CAR	89.3	43.1	89.3	90.0	40.0	
4 TOTAL NET TONS(L2 x L3)	12062.2	172.4	5897.1	6930.0	1000.0	26061.7
5 CAR TYPE	COV HOP	FLAT	COV HOP	COV HOP	BOX-EQ	
6 TARE WEIGHT PER CAR	30.5	28.2	30.5	30.5	41.4	
7 TOTAL TARE WEIGHT(L2 x L6)	4117.5	112.8	2013.0	2349.5	1035.0	9626.8
8 TOTAL GROSS TONS(2xL7+L4)	20297.2	398.0	9923.1	11627.0	3070.0	45315.4
9 ONE WAY MILES						7.00
10 TOTAL GTM(L8xL9/1000)(THOUSANDS)	142.1	2.8	69.5	81.4	21.5	317.2
11 EXPENSE/GTM(DOLLARS)						.00258
12 TOTAL GTM EXPENSE(L10 x L11 x 1000)						818.40

CAB-MILE COST

	CAB TYPE 1	2	3	4	5	6	7	TOTAL
1 CAR TYPE	BOX-UNEQ	BOX-EQ	GONDOLA	OPEN HOP	COV HOP	FLAT	TANK	
2 ONE WAY MILES								7.00
3 NUMBER OF CARS	0	25	0	0	278	4	0	307
4 COST PER CAR-MILE(DOLLARS)	.1523	.1579	.1710	.1907	.1869	.1758	.1500	
5 TOTAL CAR-MILE COST(2xL2xL3xL4)	0.00	55.28	0.00	0.00	727.50	9.85	0.00	792.62

INCREASED SHIPPERS COSTS -- DISTANCE TO ALTERNATE RAILHEAD= 35.00 MILES

	COMMODITY TYPE 1	2	3	4	5	TOTAL	
1 COMMODITY TYPE	GRAIN	WOOD PRD	GRAIN	DRY FERT	POP		
2 TOTAL NET TONS	12062.2	172.4	5897.1	6930.0	1000.0	26061.7	
3 ASSUMED TRUCK PAYLOAD(TONS)	30.5	18.9	12.8	22.0	10.4		
4 TOTAL TRUCKLOADS(L2/L3)	395.5	9.1	460.7	315.0	96.2	1276.5	
5 TOTAL NET TON-MILES(THOUSANDS)	422.2	6.0	206.4	242.5	35.0	912.2	
6 TRUCK COST PER TON	0.0000	0.0000	0.0000	0.0000	0.0000		
7 TRUCK COST PER TON-MILE	.0416	.1291	.1169	.1045	.0769		
8 TRANSSHIPMENT COST PER TON	3.0000	1.7870	2.9700	.8180	3.0000		
9 TOTAL COST(1000L5L7+L2(L6+L8))	53766.27	1087.07	41642.37	31027.34	5691.50	133214.55	
10 TRACK COST						0.00	
11 PLATFORM COST						0.00	
12 BULK FACILITY COST						0.00	
13 ANNUAL T&P COST(30 YEARS-16 %)						0.00	WITH SALVAGE(15% TRACK)
14 ANNUAL BF COST(15 YEARS-16 %)						0.00	WITH SALVAGE(5% BULK)
15 TOTAL INCREASED COST(L9+L13+L14)						133214.55	

ENTER FOLLOWING LINES OF DATA FOR STATION 2:
LINE 1: NAME OF STATION
LINE 2: RAIL DISTANCE FROM JUNCTION TO THIS STATION,
AND ALTERNATE FACILITY COSTS
LINE 3: COMMODITY CODES (UP TO 5)
LINE 4: CAR TYPE AND NUMBER OF CARLOADS FOR EACH COMMODITY
LINE 5: FREIGHT TONS PER CAR FOR EACH COMMODITY
VALLEY - ALTERNATE - TRUCK TO LEWISTON FOR BARGE

Terminal

17.20 594.00 0. 0. 0.
1
5 202
89.35

Terminal

STATION - VALLEY - ALTERNATE - TRUCK TO LEWISTON FOR BARGE

EXPENSE PER GROSS TON MILE — COMMODITY TYPE

	1	2	3	4	5	TOTAL
1 COMMODITY TYPE	1	0	0	0	0	
2 NUMBER OF CARS	202	0	0	0	0	202
3 NET TONS PER CAR	89.3	0.0	0.0	0.0	0.0	
4 TOTAL NET TONS(L2 x L3)	18048.7	0.0	0.0	0.0	0.0	18048.7
5 CAR TYPE	COV HOP					
6 TARE WEIGHT PER CAR	30.5	0.0	0.0	0.0	0.0	
7 TOTAL TARE WEIGHT(L2 x L6)	6161.0	0.0	0.0	0.0	0.0	6161.0
8 TOTAL GROSS TONS(2xL7+L4)	30370.7	0.0	0.0	0.0	0.0	30370.7
9 ONE WAY MILES						17.20
10 TOTAL GTM(L8xL9/1000)(THOUSANDS)	522.4	0.0	0.0	0.0	0.0	522.4
11 EXPENSE/GTM(DOLLARS)						.00258
12 TOTAL GTM EXPENSE(L10 x L11 x 1000)						1347.73

CAR-MILE COST — CAR TYPE

	1	2	3	4	5	6	7	TOTAL
1 CAR TYPE	BOX-UNEQ	BOX-EQ	GONDOLA	OPEN HOP	COV HOP	FLAT	TANK	
2 ONE WAY MILES								17.20
3 NUMBER OF CARS	0	0	0	0	202	0	0	202
4 COST PER CAR-MILE(DOLLARS)	.1523	.1579	.1710	.1907	.1869	.1758	.1500	
5 TOTAL CAR-MILE COST(2xL2xL3xL4)	0.00	0.00	0.00	0.00	1298.88	0.00	0.00	1298.88

INCREASED SHIPPERS COSTS -- DISTANCE TO ALTERNATE RAILHEAD= 594.00 MILES

COMMODITY TYPE

	1	2	3	4	5	TOTAL
1 COMMODITY TYPE	GRAIN					
2 TOTAL NET TONS	18048.7	0.0	0.0	0.0	0.0	18048.7
3 ASSUMED TRUCK PAYLOAD(TONS)	30.5	0.0	0.0	0.0	0.0	
4 TOTAL TRUCKLOADS(L2/L3)	591.8	0.0	0.0	0.0	0.0	591.8
5 TOTAL NET TON-MILES(THOUSANDS)	10720.9	0.0	0.0	0.0	0.0	10720.9
6 TRUCK COST PER TON	0.0000	0.0000	0.0000	0.0000	0.0000	
7 TRUCK COST PER TON-MILE	.0416	0.0000	0.0000	0.0000	0.0000	
8 TRANSSHIPMENT COST PER TON	3.0000	0.0000	0.0000	0.0000	0.0000	
9 TOTAL COST(1000L5L7+L2(L6+L8))	500565.50	0.00	0.00	0.00	0.00	500565.50
10 TRACK COST						0.00
11 PLATFORM COST						0.00
12 BULK FACILITY COST						0.00
13 ANNUAL T&P COST(30 YEARS-16 %)						0.00 WITH SALVAGE(15% TRACK)
14 ANNUAL BF COST(15 YEARS-16 %)						0.00 WITH SALVAGE(5% BULK)
15 TOTAL INCREASED COST(L9+L13+L14)						500565.50

ENTER FOLLOWING LINES OF DATA FOR STATION 3:
LINE 1: NAME OF STATION
LINE 2: RAIL DISTANCE FROM JUNCTION TO THIS STATION, AND ALTERNATE FACILITY COSTS
LINE 3: COMMODITY CODES (UP TO 5)
LINE 4: CAR TYPE AND NUMBER OF CARLOADS FOR EACH COMMODITY
LINE 5: FREIGHT TONS PER CAR FOR EACH COMMODITY

Terminal

VALLEY - NO ALTERNATE - BUSINESS CLOSE

17.20 0.00 0. 0. 0.
24
6 80
43.10

Terminal

ANNUAL ON BRANCH COSTS USING REGIONAL AVERAGE UNIT COSTS
LINE - MOUNTAIN JUNCTION TO VALLEY - EXAMPLE RUN - 7/13/82
RAILROAD - UNION NORTHERN
YEAR - 1980

STATION - VALLEY - NO ALTERNATE - BUSINESS CLOSES

EXPENSE PER GROSS TON MILE

	COMMODITY TYPE 1	2	3	4	5	TOTAL
1 COMMODITY TYPE	24	0	0	0	0	
2 NUMBER OF CARS	80	0	0	0	0	80
3 NET TONS PER CAR	43.1	0.0	0.0	0.0	0.0	
4 TOTAL NET TONS(L2 x L3)	3448.0	0.0	0.0	0.0	0.0	3448.0
5 CAR TYPE	FLAT					
6 TARE WEIGHT PER CAR	28.2	0.0	0.0	0.0	0.0	
7 TOTAL TARE WEIGHT(L2 x L6)	2256.0	0.0	0.0	0.0	0.0	2256.0
8 TOTAL GROSS TONS(2xL7+L4)	7960.0	0.0	0.0	0.0	0.0	7960.0
9 ONE WAY MILES						17.20
10 TOTAL OTM(L8xL9/1000)(THOUSANDS)	136.9	0.0	0.0	0.0	0.0	136.9
11 EXPENSE/GTM(DOLLARS)						.00258
12 TOTAL OTM EXPENSE(L10 x L11 x 1000)						353.23

CAR-MILE COST

	CAR TYPE 1 BOX-UNEQ	2 BOX-EQ	3 GONDOLA	4 OPEN HOP	5 COV HOP	6 FLAT	7 TANK	TOTAL
1 CAR TYPE								
2 ONE WAY MILES								17.20
3 NUMBER OF CARS	0	0	0	0	0	80	0	80
4 COST PER CAR-MILE(DOLLARS)	.1523	.1579	.1710	.1907	.1869	.1758	.1500	
5 TOTAL CAR-MILE COST(2xL2xL3xL4)	0.00	0.00	0.00	0.00	0.00	483.82	0.00	483.82

TRANSPORTATION COSTS		SUBTOTAL	TOTAL
TOTAL EXPENSE PER GROSS TON MILE(ALL STATIONS)		2519.36	
LOCOMOTIVE COST			
1 NUMBER OF UNITS PER TRAIN		2.0	
2 ONE WAY MILES TO FARTHEST STATION		17.20	
3 COST PER UNIT(DOLLARS)		1.5659	
4 TRAINS PER WEEK		2.00	
5 TOTAL LOCOMOTIVE COST(52x2xL1xL2xL3xL4)			11204.47
WAGES AND OTHER COST			
1 TRAINS PER WEEK		2.00	
2 ONE WAY MILES TO FARTHEST STATION		17.20	
3 COST PER TRAIN MILE		8.863	
4 TOTAL WAGE AND OTHER COST(52x2xL1xL2xL3)			31707.23
SWITCHING COST			
1 TOTAL BOX CARS		25	
2 TOTAL OTHER CARS EXCEPT FLAT CARS		480	
3 TOTAL FLAT CARS		84	
4 BOX CAR COST PER SWITCH(DOLLARS)		50.95	
5 OTHER CAR COST PER SWITCH(DOLLARS)		56.92	
6 FLAT CAR COST PER SWITCH(DOLLARS)		43.20	
7 BOX CAR SWITCH COST(L1xL4)		1273.75	
8 OTHER CAR SWITCH COST(L2xL5)		27321.60	
9 FLAT CAR SWITCH COST(L3xL6)		3628.80	
10 TOTAL SWITCH COST(L7+L8+L9)			32224.15
TOTAL TRANSPORTATION COST			27655.21

CAR COSTS					
TOTAL CAR-MILE COST(ALL STATIONS)				2575.32	
CAR DAY COST	BOX=UNEQUIP.	BOX=EQUIP.	ALL OTHER	TOTAL	
1 NUMBER OF CARS	0	25	564	589	
2 COST PER CAR(DOLLARS)	43.77	43.77	46.07		
3 TOTAL CAR DAY COST(L1xL2)	0.00	1094.25	25983.48	27077.73	27077.73
SPECIAL SERVICE CAR COST					
1 TOTAL CARLOADS(FROM STATION DATA)				589	
2 COST PER CARLOAD(DOLLARS)				14.00	
3 TOTAL SPECIAL SERVICE COST(L1xL2)				8246.00	
TOTAL CAR COST					37899.05

MAINTENANCE OF WAY AND STRUCTURES		
1 LINE LENGTH	17.20	
2 NORMALIZED COST PER MILE(DOLLARS)	6360.00	
3 TOTAL MOW COST(L1xL2)		109392.00

RETURN ON VALUE		
1 NET LIQUIDATION VALUE OF MATERIALS(DOLLARS)	172000.00	
2 LAND VALUE(DOLLARS)	261000.02	
3 TOTAL VALUE(DOLLARS)	433000.02	
4 RATE OF RETURN(PERCENT)	12.100	
5 TOTAL RETURN ON VALUE(L3xL4/100)		52393.00

TOTAL ANNUAL ON BRANCH COST	277339.26
TOTAL ANNUAL OFF BRANCH COST	834661.00
TOTAL ANNUAL AVOIDABLE COST	1112000.26
TOTAL ANNUAL REVENUE	3583580.00
TOTAL ANNUAL PROFIT OR LOSS	2471579.74
TOTAL SHIPPER COST(ALL STATIONS)	633780.05
TOTAL ANNUAL CARS PER MILE	34.2
TOTAL ANNUAL MGTM PER MILE(INCLUDING LOCOMOTIVES)	.1088

```
TYPE FORT08.DAT
MOUNTAIN JUNCTION TO VALLEY - EXAMPLE RUN - 7/13/82
1980UNION NORTHERN
 .002580   14.00 1.56592 8.86271
 .152341 .157949 .171033 .190660 .186921 .175806 .150000
43.7700 43.7700 46.0700 50.9500 56.9200 43.2000
 6360.0015174.42 172000.  12.103583580.  834661.
 17.200  2.000  125.00  2.000      3       1
    56   POP    0.0000  .0769  3.0000 10.4000
      1HILL - ALTERNATE STATION - PLAINTOWN
  7.00  35.00      0.      0.      0.
     1     24      51      54      56
5  135 6   4 5   66 5   77 2   25
 89.35  43.10  89.35  90.00  40.00
      2VALLEY - ALTERNATE - TRUCK TO LEWISTON FOR BARGE
 17.20 594.00      0.      0.      0.
     1      0       0       0       0
5  202 0   0 0   0 0   0 0   0
 89.35   0.00    0.00    0.00    0.00
      3VALLEY - NO ALTERNATE - BUSINESS CLOSES
 17.20   0.00      0.      0.      0.
     24     0       0       0       0
6   80 0   0 0   0 0   0 0   0
 43.10   0.00    0.00    0.00    0.00
```

INPUT TO BRANCH

A>

1

Dummy which program ignores.
Begin linename in column 1 when using terminal

BRANCH

ARE YOU GOING TO USE AN EXISTING INPUT FILE? (YES OR NO)
YES

Terminal

LINE - MOUNTAIN JUNCTION TO VALLEY - EXAMPLE RUN - 7/13/82
RAILROAD - UNION NORTHERN
YEAR - 1980

STATION - HILL - ALTERNATE STATION - PLAINTOWN

EXPENSE PER GROSS TON MILE

	COMMODITY TYPE 1	2	3	4	5	TOTAL
1 COMMODITY TYPE	1	24	51	54	56	
2 NUMBER OF CARS	135	4	66	77	25	307
3 NET TONS PER CAR	89.3	43.1	89.3	90.0	40.0	
4 TOTAL NET TONS(L2 x L3)	12062.2	172.4	5897.1	6930.0	1000.0	26061.7
5 CAR TYPE	COV HOP	FLAT	COV HOP	COV HOP	BOX-EQ	
6 TARE WEIGHT PER CAR	30.5	28.2	30.5	41.4		
7 TOTAL TARE WEIGHT(L2 x L6)	4117.5	112.8	2013.0	2348.5	1035.0	9626.8
8 TOTAL GROSS TONS(2xL7+L4)	20297.2	398.0	9923.1	11627.0	3070.0	45315.4
9 ONE WAY MILES						7.00
10 TOTAL OTM(L8xL9/1000)(THOUSANDS)	142.1	2.8	69.5	81.4	21.5	317.2
11 EXPENSE/GTM(DOLLARS)						.00258
12 TOTAL OTM EXPENSE(L10 x L11 x 1000)						818.40

CAR-MILE COSI

	CAR TYPE 1 BOX-UNEQ	2 BOX-EQ	3 GONDOLA	4 OPEN HOP	5 COV. HOP	6 FLAT	7 TANK	TOTAL
1 CAR TYPE								
2 ONE WAY MILES								7.00
3 NUMBER OF CARS	0	25	0	0	278	4	0	307
4 COST PER CAR-MILE(DOLLARS)	.1523	.1579	.1710	.1907	.1869	.1758	.1500	
5 TOTAL CAR-MILE COST(2xL2xL3xL4)	0.00	55.28	0.00	0.00	727.50	9.85	0.00	792.62

INCREASED SHIPPERS COSIS -- DISTANCE TO ALTERNATE RAILHEAD= 35.00 MILES

	COMMODITY TYPE 1 GRAIN	2 WOOD PRD	3 GRAIN	4 DRY FERT	5 POP	TOTAL
1 COMMODITY TYPE						
2 TOTAL NET TONS	12062.2	172.4	5897.1	6930.0	1000.0	26061.7
3 ASSUMED TRUCK PAYLOAD(TONS)	30.5	18.9	12.8	22.0	10.4	
4 TOTAL TRUCKLOADS(L2/L3)	395.5	9.1	460.7	315.0	96.2	1276.5
5 TOTAL NET TON-MILES(THOUSANDS)	422.2	6.0	206.4	242.5	35.0	912.2
6 TRUCK COST PER TON	0.0000	0.0000	0.0000	0.0000	0.0000	
7 TRUCK COST PER TON-MILE	.0416	.1291	.1169	.1045	.0769	
8 TRANSSHIPMENT COST PER TON	3.0000	1.7870	2.9700	.8180	3.0000	
9 TOTAL COST(1000L5L7+L2(L6+L8))	53766.27	1087.07	41642.37	31027.34	5691.50	133214.55
10 TRACK COST						0.00
11 PLATFORM COST						0.00
12 BULK FACILITY COST						0.00
13 ANNUAL T&P COST(30 YEARS-16 %)						0.00 WITH SALVAGE(15% TRACK)
14 ANNUAL BF COST(15 YEARS-16 %)						0.00 WITH SALVAGE(5% BULK)
15 TOTAL INCREASED COST(L9+L13+L14)						133214.55

ANNUAL ON BRANCH COSTS USING REGIONAL AVERAGE UNIT COSTS
LINE - MOUNTAIN JUNCTION TO VALLEY - EXAMPLE RUN - 7/13/82
RAILROAD - UNION NORTHERN
YEAR - 1980

STATION - VALLEY - ALTERNATE - TRUCK TO LEWISTON FOR BARGE

EXPENSE PER GROSS TON MILE — COMMODITY TYPE

	1	2	3	4	5	TOTAL
1 COMMODITY TYPE	1	0	0	0	0	
2 NUMBER OF CARS	202	0	0	0	0	202
3 NET TONS PER CAR	89.3	0.0	0.0	0.0	0.0	
4 TOTAL NET TONS(L2 x L3)	18048.7	0.0	0.0	0.0	0.0	18048.7
5 CAR TYPE	COV HOP					
6 TARE WEIGHT PER CAR	30.5	0.0	0.0	0.0	0.0	
7 TOTAL TARE WEIGHT(L2 x L6)	6161.0	0.0	0.0	0.0	0.0	6161.0
8 TOTAL GROSS TONS(2xL7+L4)	30370.7	0.0	0.0	0.0	0.0	30370.7
9 ONE WAY MILES						17.20
10 TOTAL GTM(L8xL9/1000)(THOUSANDS)	522.4	0.0	0.0	0.0	0.0	522.4
11 EXPENSE/GTM(DOLLARS)						.00258
12 TOTAL GTM EXPENSE(L10 x L11 x 1000)						1347.73

CAR-MILE COST — CAR TYPE

	1	2	3	4	5	6	7	TOTAL
1 CAR TYPE	BOX-UNEQ	BOX-EQ	GONDOLA	OPEN HOP	COV HOP	FLAT	TANK	
2 ONE WAY MILES								17.20
3 NUMBER OF CARS	0	0	0	0	202	0	0	202
4 COST PER CAR-MILE(DOLLARS)	.1523	.1579	.1710	.1907	.1869	.1758	.1500	
5 TOTAL CAR-MILE COST(2xL2xL3xL4)	0.00	0.00	0.00	0.00	1298.88	0.00	0.00	1298.88

INCREASED SHIPPERS COSTS -- DISTANCE TO ALTERNATE RAILHEAD= 594.00 MILES

COMMODITY TYPE

	1	2	3	4	5	TOTAL
1 COMMODITY TYPE	GRAIN					
2 TOTAL NET TONS	18048.7	0.0	0.0	0.0	0.0	18048.7
3 ASSUMED TRUCK PAYLOAD(TONS)	30.5	0.0	0.0	0.0	0.0	
4 TOTAL TRUCKLOADS(L2/L3)	591.8	0.0	0.0	0.0	0.0	591.8
5 TOTAL NET TON-MILES(THOUSANDS)	10720.9	0.0	0.0	0.0	0.0	10720.9
6 TRUCK COST PER TON	0.0000	0.0000	0.0000	0.0000	0.0000	
7 TRUCK COST PER TON-MILE	.0416	0.0000	0.0000	0.0000	0.0000	
8 TRANSSHIPMENT COST PER TON	3.0000	0.0000	0.0000	0.0000	0.0000	
9 TOTAL COST(1000L5L7+L2(L6+L8))	500565.50	0.00	0.00	0.00	0.00	500565.50
10 TRACK COST						0.00
11 PLATFORM COST						0.00
12 BULK FACILITY COST						0.00
13 ANNUAL T&P COST(30 YEARS-16 %)						0.00 WITH SALVAGE(15% TRACK)
14 ANNUAL BF COST(15 YEARS-16 %)						0.00 WITH SALVAGE(5% BULK)
15 TOTAL INCREASED COST(L9+L13+L14)						500565.50

STATION - VALLEY - NO ALTERNATE - BUSINESS CLOSES

EXPENSE PER GROSS TON MILE

	COMMODITY TYPE 1	2	3	4	5	TOTAL
1 COMMODITY TYPE	24	0	0	0	0	
2 NUMBER OF CARS	80	0	0	0	0	80
3 NET TONS PER CAR	43.1	0.0	0.0	0.0	0.0	
4 TOTAL NET TONS(L2 x L3)	3448.0	0.0	0.0	0.0	0.0	3448.0
5 CAR TYPE	FLAT					
6 TARE WEIGHT PER CAR	28.2	0.0	0.0	0.0	0.0	
7 TOTAL TARE WEIGHT(L2 x L6)	2256.0	0.0	0.0	0.0	0.0	2256.0
8 TOTAL GROSS TONS(2xL7+L4)	7960.0	0.0	0.0	0.0	0.0	7960.0
9 ONE WAY MILES						17.20
10 TOTAL GTM(L8xL9/1000)(THOUSANDS)	136.9	0.0	0.0	0.0	0.0	136.9
11 EXPENSE/GTM(DOLLARS)						.00258
12 TOTAL GTM EXPENSE(L10 x L11 x 1000)						353.23

CAR-MILE COST

	CAR TYPE 1	2	3	4	5	6	7	TOTAL
1 CAR TYPE	BOX-UNEQ	BOX-EQ	GONDOLA	OPEN HOP	COV HOP	FLAT	TANK	
2 ONE WAY MILES								17.20
3 NUMBER OF CARS	0	0	0	0	0	80	0	80
4 COST PER CAR-MILE(DOLLARS)	.1523	.1579	.1710	.1907	.1869	.1758	.1500	
5 TOTAL CAR-MILE COST(2xL2xL3xL4)	0.00	0.00	0.00	0.00	0.00	483.82	0.00	483.82

TRANSPORTATION COSTS		SUBTOTAL	TOTAL
TOTAL EXPENSE PER GROSS TON MILE(ALL STATIONS)		2519.36	
LOCOMOTIVE COST			
1 NUMBER OF UNITS PER TRAIN		2.0	
2 ONE WAY MILES TO FARTHEST STATION		17.20	
3 COST PER UNIT(DOLLARS)		1.5659	
4 TRAINS PER WEEK		2.00	
5 TOTAL LOCOMOTIVE COST(52x2xL1xL2xL3xL4)			11204.47
WAGES AND OTHER COST			
1 TRAINS PER WEEK		2.00	
2 ONE WAY MILES TO FARTHEST STATION		17.20	
3 COST PER TRAIN MILE		8.863	
4 TOTAL WAGE AND OTHER COST(52x2xL1xL2xL3)			31707.23
SWITCHING COST			
1 TOTAL BOX CARS		25	
2 TOTAL OTHER CARS EXCEPT FLAT CARS		480	
3 TOTAL FLAT CARS		84	
4 BOX CAR COST PER SWITCH(DOLLARS)		50.95	
5 OTHER CAR COST PER SWITCH(DOLLARS)		56.92	
6 FLAT CAR COST PER SWITCH(DOLLARS)		43.20	
7 BOX CAR SWITCH COST(L1xL4)		1273.75	
8 OTHER CAR SWITCH COST(L2xL5)		27321.60	
9 FLAT CAR SWITCH COST(L3xL6)		3628.80	
10 TOTAL SWITCH COST(L7+L8+L9)			32224.15
TOTAL TRANSPORTATION COST			77655.21

CAR COSTS					
TOTAL CAR-MILE COST(ALL STATIONS)				2575.32	
CAR DAY COST	BOX-UNEQUIP.	BOX-EQUIP.	ALL OTHER	TOTAL	
1 NUMBER OF CARS	0	25	564	589	
2 COST PER CAR(DOLLARS)	43.77	43.77	46.07		
3 TOTAL CAR DAY COST(L1xL2)	0.00	1094.25	25983.48	27077.73	27077.73
SPECIAL SERVICE CAR COST					
1 TOTAL CARLOADS(FROM STATION DATA)			589		
2 COST PER CARLOAD(DOLLARS)			14.00		
3 TOTAL SPECIAL SERVICE COST(L1xL2)				8246.00	
TOTAL CAR COST					37899.05

MAINTENANCE OF WAY AND STRUCTURES		
1 LINE LENGTH	17.20	
2 NORMALIZED COST PER MILE(DOLLARS)	6360.00	
3 TOTAL MOW COST(L1xL2)		109392.00

RETURN ON VALUE		
1 NET LIQUIDATION VALUE OF MATERIALS(DOLLARS)	172000.00	
2 LAND VALUE(DOLLARS)	261000.02	
3 TOTAL VALUE(DOLLARS)	433000.02	
4 RATE OF RETURN(PERCENT)	12.100	
5 TOTAL RETURN ON VALUE(L3xL4/100)		52393.00

TOTAL ANNUAL ON BRANCH COST	277339.26
TOTAL ANNUAL OFF BRANCH COST	834661.00
TOTAL ANNUAL AVOIDABLE COST	1112000.26
TOTAL ANNUAL REVENUE	3583580.00
TOTAL ANNUAL PROFIT OR LOSS	2471579.74
TOTAL SHIPPER COST(ALL STATIONS)	633780.05
TOTAL ANNUAL CARS PER MILE	34.2
TOTAL ANNUAL MGTM PER MILE(INCLUDING LOCOMOTIVES)	.1088

EFFICIENCY BENEFITS

Program Control

Program Name

EFFBEN

Abstract

Efficiency benefits of alternative rail projects are calculated in 3 components: cost reduction on existing traffic, consumer surplus on new traffic, and producer surplus on new traffic.

1. Interactive mode:
   Lu 1: Title information, unit costs, and prices are read from a terminal in response to program-generated prompts.
2. Batch mode:
   Lu 9: All data from a previously-created file are read from disk.

Disk Output

Lu 9: All input data only if data are entered from terminal.

Printed Output

The program lists the following:

1. All input data
2. 3 components of efficiency benefits before project is implementd.
3. 3 components of efficiency benefits after project is implemented.

EFFICIENCY BENEFITS PROGRAM

DATA INPUT SEQUENCE

RECORD TYPE	NUMBER OF RECORDS	RECORD COLUMN INFORMATION				REMARKS
		Column	FORTRAN Format	Field Contents	Units	
Line	1	1-80	20A4	Name of branch line.	Any alphanumeric characters	For batch mode run from previously created file, format is I2, 20A4. Enter any integer (dummy value).
Railroad	1	1-80	20A4	Name of railroad company.	See line record	See line record.
Alternate	1	1-80	20A4	Description of alternative being tested.	See line record	See line record.
Assumptions	1	1-80	20A4	Assumptions influencing this alternative.	See line record	See line record.
Tons	1	1-8	F8.0	Existing tons originating and terminating on branch.	Tons	
		10-17	F8.0	Future tons if alternative is implemented.	Tons	
Cost	1	1-8	F8.3	Total cost/ton to transport existing tonnage.	$/ton	
		10-17	F8.3	Total cost/ton to transport future tons.	$/ton	

EFFICIENCY BENEFITS PROGRAM

DATA INPUT SEQUENCE
(Continued)

RECORD TYPE	NUMBER OF RECORDS	RECORD COLUMN INFORMATION				REMARKS
		Column	FORTRAN Format	Field Contents	Units	
Price	1	1-8	F8.3	Total price/ton to transport existing tonnage.	$/ton	
		10-17	F8.3	Total price/ton to transport future tonnage.	$/ton	
Cost W/O Alternative	1	1-8	F8.3	Total average cost/ton if alternative is not implemented and situation continues without intervention.	$/ton	Can be used to test effects of abandonment by entering cost/ton for truck transport in this field.

EFFICIENCY BENEFIT PROGRAM

Line Name

MOUNTAIN JUNCTION TO VALLEY - EXAMPLE RUN - 7/13/82

Railroad Name

UNION NORTHERN

Alternate

REHABILITATION

Assumptions

W/O LINE, SHIPPERS TRUCK TO PLAINTOWN & LEWISTON, SAWMILL CLOSES. 20% INC. W/PROJ

Existing Tons	Future Tons
47558.4	57070.1
Existing Cost/Ton	**Future Cost/Ton**
23.38	20.11
Existing Price/Ton	**Future Price/Ton**
75.35	74.65
Cost/Ton If Not Implemented	
81.95	

EFFREN

ARE YOU GOING TO USE AN EXISTING INPUT FILE? (YES OR NO)
NO

Terminal

ENTER LINE NAME (UP TO 80 CHARACTERS)
MOUNTAIN JUNCTION TO VALLEY - EXAMPLE RUN - 7/13/82

ENTER RAILROAD NAME (UP TO 80 CHARACTERS)
UNION NORTHERN

ENTER ALTERNATIVE (UP TO 80 CHARACTERS)
REHABILITATION

ENTER ASSUMPTIONS (UP TO 80 CHARACTERS)
W/O LINE. SHIPPERS TRUCK TO PLAINTAOOWN & LEWISTON, SAWMILL CLOSES.20% INC W/PROJ

ENTER EXISTING TONS AND THEN
TONS AFTER ALTERNATIVE IS IMPLEMENTED
(7 DIGITS + DECIMAL -- SEPARATED BY BLANK)
47558.4 57070.1

ENTER COST/TON BEFORE ALTERNATIVE AND THEN
COST /TON AFTER ALTERNATIVE
(7 DIGITS + DECIMAL -- SEPARATED BY BLANK)
23.38 20.11

ENTER PRICE/TON BEFORE ALTERNATIVE AND THEN
PRICE/TON AFTER ALTERNATIVE
(7 DIGITS + DECIMAL -- SEPARTATED BY BLANK)
75.35 74.65

ENTER COST/TON IS ALTERNATIVE IS NOT IMPLEMENTED
(7 DIGITS + DECIMAL)
81.95

LINE: MOUNTAIN JUNCTION TO VALLEY - EXAMPLE RUN - 7/13/82

RAILROAD: UNION NORTHERN
ALTERNATIVE: REHABILITATION
ASSUMPTION: W/O LINE, SHIPPERS TRUCK TO PLAINTOWN & LEWISTON, SAWMILL CLOSES.20% INC W/PROJ

INPUT DATA

TONNAGE BEFORE ALTERNATIVE	47558.
TONNAGE AFTER ALTERNATIVE	57070.
COST TO CARRY TONNAGE BEFORE ALTERNATIVE ($/T)	23.380
COST TO CARRY TONNAGE AFTER ALTERNATIVE ($/T)	20.110
COST TO CARRY TONNAGE IF ALTERNATIVE IS NOT IMPLEMENTED ($/T)	81.950
PRICE TO CARRY TONNAGE BEFORE ALTERNATIVE ($/T)	75.350
PRICE TO CARRY TONNAGE AFTER ALTERNATIVE ($/T)	74.650

EFFICIENCY BENEFITS: INITIAL YEAR(S)

COST REDUCTION ON EXISTING TRAFFIC	155516.
CONSUMER SURPLUS ON NEW TRAFFIC	3329.
PRODUCER SURPLUS ON NEW TRAFFIC	518768.
COST REDUCTION + PRODUCER SURPLUS	674284.
TOTAL EFFICIENCY BENEFITS: INITIAL YEAR(S)	677613.

EFFICIENCY BENEFITS: SUBSEQUENT YEARS

COST REDUCTION ON EXISTING TRAFFIC	2941011.
CONSUMER SURPLUS ON NEW TRAFFIC	393071.
PRODUCER SURPLUS ON NEW TRAFFIC	518768.
COST REDUCTION + PRODUCER SURPLUS	3459779.
TOTAL EFFICIENCY BENEFITS: SUBSEQUENT YEARS	3852850.

TYPE FORTO9.DAT

Sample input to EFFBEN

```
1MOUNTAIN JUNCTION TO VALLEY - EXAMPLE RUN - 7/13/82
1UNION NORTHERN
1REHABILITATION
1W/O LINE, SHIPPERS TRUCK TO PLAINTOWN & LEWISTON, SAWMILL CLOSES.20% INC W/PROJ
 47558.  57070.
 23.380  20.110
 75.350  74.650
 81.950
(A>
```

CENSUS AND ECONOMIC
INFORMATION CENTER
MONTANA DEPT. OF COMMERCE
HELENA, MT 59620-0401
(406) 444-2896

EFFBEN

ARE YOU GOING TO USE AN EXISTING INPUT FILE? (YES OR NO)
YES

Terminal

LINE: MOUNTAIN JUNCTION TO VALLEY - EXAMPLE RUN - 7/13/82
RAILROAD: UNION NORTHERN
ALTERNATIVE: REHABILITATION
ASSUMPTION: W/O LINE, SHIPPERS TRUCK TO PLAINTOWN & LEWISTON, SAWMILL CLOSES.20% INC W/PROJ

INPUT DATA	
TONNAGE BEFORE ALTERNATIVE	47558.
TONNAGE AFTER ALTERNATIVE	57070.
COST TO CARRY TONNAGE_BEFORE ALTERNATIVE ($/T)	23.380
COST TO CARRY TONNAGE_AFTER ALTERNATIVE ($/T)	20.110
COST TO CARRY TONNAGE_IF ALTERNATIVE IS NOT IMPLEMENTED ($/T)	81.950
PRICE TO CARRY_TONNAGE_BEFORE_ALTERNATIVE ($/T)	75.350
PRICE TO CARRY_TONNAGE_AFTER ALTERNATIVE ($/T)	74.650
EFFICIENCY BENEFITS: INITIAL YEAR(S)	
COST REDUCTION ON EXISTING TRAFFIC	155515.
CONSUMER SURPLUS ON NEW TRAFFIC	3329.
PRODUCER SURPLUS ON NEW TRAFFIC	518784.
COST REDUCTION + PRODUCER SURPLUS	674299.
TOTAL EFFICIENCY BENEFITS: INITIAL YEAR(S)	677628.
EFFICIENCY BENEFITS: SUBSEQUENT YEARS	
COST REDUCTION ON EXISTING TRAFFIC	2940986.
CONSUMER SURPLUS ON NEW TRAFFIC	393083.
PRODUCER SURPLUS ON NEW TRAFFIC	518784.
COST REDUCTION + PRODUCER SURPLUS	3459771.
TOTAL EFFICIENCY BENEFITS: SUBSEQUENT YEARS	3852854.

BENEFIT/COST

Program Control

Program Name

BENCST

Abstract

Benefit/cost ratios and net present values are calculated for a given stream of costs and benefits at user-specified discount rates. Optionally, the internal rate of return (the discount rate at which the net present value equals zero) is also calculated.

Input

1. Interactive mode:
   Lu 1: All data are read from a terminal in response to program-generated prompts.
2. Batch mode:
   LU 10: All data from a previously-created file are read from disk. Several blocks of data can be included for separate analyses.

Disk Output

LU 10: All input data only if data are entered from terminal.

Printed Output

The program lists the following:

1. For each user-specified discount rate, the stream of benefits and costs and the present value of both. Then a net present value and benefit/cost ratio are printed.

2. Optionally, the program prints the internal rate of return.

BENEFIT/COST PROGRAM

DATA INPUT SEQUENCE
INTERACTIVE MODE

RECORD TYPE	NUMBER OF RECORDS	RECORD COLUMN INFORMATION				REMARKS
		Column	FORTRAN Format	Field Contents	Units	
Title-Line 1	1	1-80	20A4	Any alphanumeric characters.		All 4 title lines are printed at top of each page.
Title-Line 2	1	1-80	20A4	Any alphanumeric characters.		
Title-Line 3	1	1-80	20A4	Any alphanumeric characters.		
Title-Line 4	1	1-80	20A4	Any alphanumeric characters.		
Footnote	1	1-80	20A4	Any alphanumeric characters.		Printed at bottom of page. Used to indicate monetary units.
Number of Years	1	1-2	I2	Number of years in analysis period.	Valid values= 2-50	
First Analysis Year	1	1-4	I4	Beginning year of analysis period.	Years	1980, 1981 etc.
Number of Discount Rates	1	1-2	I-2	Number of rates to be used.	Valid values= 1-10	Separate calculation for each rate.
Discount Rates	1	1-4	F4.2	1st rate	Percent	Number of rates to be used must match the value in previous record.
		6-9	F4.2	2nd rate		
		11-14	F4.2	3rd rate		
		16-19	F4.2	4th rate		
		21-24	F4.2	5th rate		
		26-29	F4.2	6th rate		
		31-34	F4.2	7th rate		
		36-39	F4.2	8th rate		
		41-44	F4.2	9th rate		
		46-49	F4.2	10th rate		

BENEFIT/COST PROGRAM

DATA INPUT SEQUENCE
INTERACTIVE MODE
(Continued)

RECORD TYPE	NUMBER OF RECORDS	RECORD COLUMN INFORMATION				REMARKS
		Column	FORTRAN Format	Field Contents	Units	
Benefit Types	1	1	I1	Number of benefit types.	Valid values=1-4	At least 1 required
		3-10	4A2	1st benefit name	Any alphanumeric characters	
		12-19	4A2	2nd benefit name		
		21-28	4A2	3rd benefit name		
		30-37	4A2	4th benefit name		
Cost and Benefit Factors	1 (Optional)	1-5	F5.2	Cost factor		Factors to be applied to each cost and benefit stream. Optional-use only if answer is YES to question at terminal.
		7-11	F5.2	Benefit 1 factor		
		13-17	F5.2	Benefit 2 factor		
		19-23	F5.2	Benefit 3 factor		
		25-29	F5.2	Benefit 4 factor		
Number of Cost Stream Interpolation Periods	1 (Optional)	1	I1		Valid values=0-4 0 if none	Optional-use only if answer is YES to question at terminal.
Cost Stream Interpolation Years	1 (Optional)	1-4	I4	Beginning year-Period 1	Years	Number of pairs of years must equal value in previous record. Program will interpolate costs within period and override any value entered in the period.
		6-9	I4	Ending year-Period 1		
		11-14	I4	Beginning year-Period 2		
		16-19	I4	Ending year-Period 2		
		21-24	I4	Beginning year-Period 3		
		26-29	I4	Ending year-Period 3		
		31-34	I4	Beginning year-Period 4		
		36-39	I4	Ending year-Period 4		

BENEFIT/COST PROGRAM

DATA INPUT SEQUENCE
INTERACTIVE MODE
(Continued)

RECORD TYPE	NUMBER OF RECORDS	RECORD COLUMN INFORMATION				
		Column	FORTRAN Format	Field Contents	Units	REMARKS
Number of Benefit Stream 1 Interpolation Periods	1 (Optional)	1	I1		Valid values=0-4 0 if none	
Benefit Stream 1 Interpolation Years	1 (Optional)	1-40	8(I4,1X)	Same as cost stream interpolation	Years	Same as cost stream interpolation.
Number of Benefit Steam 2 Interpolation Periods	1 (Optional)	1	I1		Valid values=0-4 0 if none	
Benefit Stream 2 Interpolation Years	1 (Optional)	1-40	8(I4,1X)	Same as cost stream interpolation	Years	Same as cost stream interpolation.
Number of Benefit Stream 3 Interpolation Periods	1 (Optional)	1	I1	Valid values=0-4 0 if none		
Benefit Stream 3 Interpolation Years	1 (Optional)	1-40	8(I4,1X)	Same as cost stream interpolation	Years	Same as cost stream interpolation.

BENEFIT/COST PROGRAM

DATA INPUT SEQUENCE
INTERACTIVE MODE
(Continued)

RECORD TYPE	NUMBER OF RECORDS	RECORD COLUMN INFORMATION				
		Column	FORTRAN Format	Field Contents	Units	REMARKS
Number of Benefit Stream 4 Interpolation Periods	1 (Optional)	1	I1		Valid value=0-4 0 if none	
Benefit Stream 4 Interpolation Years	1 (Optional)	1-40	8(I4,1X)	Same as cost stream interpolation	Years	Same as cost stream interpolation.
Benefit/ Cost Data	Up to 50	1-5	I4	Year		Repeat for each year for which data are to be entered. Do not enter a record for year with no cost or benefits or for intermediate years of an interpolation period.
		6-13	F8.3	Cost value		
		15-22	F8.3	Benefit 1 value		
		24-31	F8.3	Benefit 2 value		
		33-40	F8.3	Benefit 3 value		
		42-49	F8.3	Benefit 4 value		
Last Record	1	1-4	I4	Zero	Valid value=0	

BENEFIT/COST PROGRAM

DATA INPUT SEQUENCE
BATCH MODE

RECORD TYPE	NUMBER OF RECORDS	RECORD COLUMN INFORMATION				REMARKS
		Column	FORTRAN Format	Field Contents	Units	
Title-Line 1	1	1-2	I2	Any integer		Used as dummy.
		3-82	20A4	Any alphanumeric		
Title-Line 2	1	1-2	I2	Any integer		See Title-Line 1
		3-82	20A4	Any alphanumeric		
Title-Line 3	1	1-2	I2	Any integer		See Title-Line 1
		3-82	20A4	Any alphanumeric		
Title-Line 4	1	1-2	I2	Any integer		See Title-Line 1
		3-82	20A4	Any alphanumeric		
Footnote	1	1-2	I2	Any integer		See Title-Line 1
		3-82	20A4	Any alphanumeric		
Control Record	1	1-5	I5	Number of years	Valid values=2-50	
		6-10	I5	Beginning year of analysis period	Years	1980, 1981 etc.
		11-15	I5	Number of benefit types	Valid values=1-4	At least 1 required
		16-20	I5	Interpolation flag	0=No interpolation 1=Interpolation	
		21-25	I5	Factor flag	0=No factoring 1=Factoring	
		26-30	I5	Number of discount rates to be used	Valid values=1-10	
		31-35	F5.2	1st rate	Percent	
		36-40	F5.2	2nd rate		
		41-45	F5.2	3rd rate		
		46-50	F5.2	4th rate		
		51-55	F5.2	5th rate		
		56-60	F5.2	6th rate		
		61-65	F5.2	7th rate		
		66-70	F5.2	8th rate		
		71-75	F5.2	9th rate		
		76-80	F5.2	10th rate		

BENEFIT/COST PROGRAM

DATA INPUT SEQUENCE
BATCH MODE
(Continued)

RECORD TYPE	NUMBER OF RECORDS	RECORD COLUMN INFORMATION				
		Column	FORTRAN Format	Field Contents	Units	REMARKS
Benefit Types	1	1-2	I2	Any integer		Used as dummy.
		3-12	4A2	1st benefit name	Any alphanumeric characters	
		13-22	4A2	2nd benefit name		
		23-32	4A2	3rd benefit name		
		33-42	4A2	4th benefit name		
Benefit and Cost Factors	1 (Optional)	1-5	F5.2	Cost factor		Optional-use only if Column 25 of control record is 1.
		6-10	F5.2	Benefit 1 factor		
		11-15	F5.2	Benefit 2 factor		
		16-20	F5.2	Benefit 3 factor		
		21-25	F5.2	Benefit 4 factor		
Interpolation Record-Costs	1 (Optional)	1-5	I5	Cost record identifier	Valid value=0	Optional-cost and 4 benefit interpolation records required only if column 20 of control record is 1.
		6-10	I5	Beginning year-Period 1		
		11-15	I5	Ending year-Period 1		
		16-20	I5	Beginning year-Period 2		
		21-25	I5	Ending year-Period 2		
		26-30	I5	Beginning year-Period 3		
		31-35	I5	Ending year-Period 3		
		36-40	I5	Beginning year-Period 4		
		41-45	I5	Ending year-Period 4		

BENEFIT/COST PROGRAM

DATA INPUT SEQUENCE
BATCH MODE
(Continued)

RECORD TYPE	NUMBER OF RECORDS	RECORD COLUMN INFORMATION				REMARKS
		Column	FORTRAN Format	Field Contents	Units	
Interpolation Record-Benefit 1	1 (Optional)	1-5	I5	Benefit 1 record identifier	Valid value=1	See Interpolation Record - Costs.
		6-45	8I5	Same as cost stream		
Interpolation Record-Benefit 2	1 (Optional)	1-5	I5	Benefit 2 record identifier	Valid value=2	See Interpolation Record - Costs.
		6-45	8I5	Same as cost stream		
Interpolation Record-Benefit 3	1 (Optional)	1-5	I5	Benefit 3 record identifier	Valid value=3	See Interpolation Record - Costs.
		6-45	8I5	Same as cost stream		
Interpolation Record-Benefit 4	1 (Optional)	1-5	I5	Benefit 4 record identifier	Valid value=4	See Interpolation Record - Costs.
		6-45	8I5	Same as cost stream		
Interpolation Record-Last	1 (Optional)	1-5	I5	Last interpolation record identifier	Valid value=5	Required only if previous 4 records are present.

BENEFIT/COST PROGRAM

DATA INPUT SEQUENCE
BATCH MODE
(Continued)

RECORD TYPE	NUMBER OF RECORDS	RECORD COLUMN INFORMATION				
		Column	FORTRAN Format	Field Contents	Units	REMARKS
Benefits/ Cost Data	Up to 50	1-5	I5	Year		Repeat for each year for which data are to be entered. Do not enter a record for year with no cost or benefits or for intermediate years of an interpolation period.
		6-13	F8.3	Cost value		
		14-21	F8.3	Benefit 1 value		
		22-29	F8.3	Benefit 2 value		
		30-37	F8.3	Benefit 3 value		
		38-45	F8.3	Benefit 4 value		
Last Record	1	1-5	I5	Zero	Valid value=0	

BENEFIT/COST PROGRAM

Title - 4 Lines
MOUNTAIN JUNCTION TO VALLEY - EXAMPLE RUN - 7/13/82
UNION NORTHERN
REHABILITATION
W/C LINE, SHIPPERS TRUCK TO PLAINTOWN AND LEWISTON - SAWMILL CLOSES DOWN
Footnote
COSTS AND BENEFITS IN THOUSANDS OF DOLLARS
Number of years - 2 Digits, No Decimal
10
First Analysis Year - 4 Digits, No Decimal
1982
Number of Discount Rates - 2 Digits, No Decimal
2
Discount Rates - 3 Digits + Decimal, Separated by Blanks
4. 15.
Number of Benefit Types and Names of up to 4 Benefits, Separated by Blanks
4 TRK/USER BARGE SALVAGE PAYROLL
Cost and Benefit Stream Factors (Optional) - 4 Digits + Decimal, Separated by Blanks
Cost Stream Interpolation, Number of Interpolations or Zero if None
1
Cost Stream Interpolation, Starting and Ending Year for Each Period, Seperated by Blanks
1983 1991

BENEFIT/COST PROGRAM

Benefit Stream 1 Interpolation, Number of Interpolations or Zero if None

1

Benefit Stream 1 Interpolation, Starting and Ending Year for Each Period, Separated by Blanks.

1983 1991

Benefit Stream 2 Interpolation, Number of Interpolations or Zero if None

1

Benefit Stream 2 Interpolation, Starting and Ending Year for Each Period, Separated by Blanks.

1983 1991

Benefit Stream 3 Interpolation, Number of Interpolations or Zero if None

0

Benefit Stream 3 Interpolation, Starting and Ending Year for Each Period, Separated by Blanks.

Benefit Stream 4 Interpolation Number of Interpolations or Zero if None

1

Benefit Stream 4 Interpolation, Starting and Ending Year for Each Period, Separated by Blanks.

1983 1985

Year	Cost	Benefit 1	Benefit 2	Benefit 3	Benefit 4
1982	1664.161	0.000	0.000	0.000	0.000
1983	1112.000	633.780	108.292	0.000	250.000
1985	0.000	0.000	0.000	0.000	250.000
1991	1112.000	633.780	108.292	1003.104	0.000

0

```
BENCST

ARE YOU GOING TO USE EXISTING INPUT FILE?  (YES OR NO)
NO
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Terminal

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ENTER TITLE TO BE PRINTED AT TOP OF PAGE
(80 CHARACTERS MAXIMUM PER LINE, 4 LINES)
MOUNTAIN JUNCTION TO VALLEY - EXAMPLE RUN - 7/13/82
UNION NORTHERN
REHABILITATION
W/O LINE, SHIPPPERS TRUCK TO PLAINTOWN AND LEWISTON - SAWMILL CLOSES DOWN

ENTER FOOTNOTE TO BE PRINTED AT BOTTOM OF PAGE(80 CHARACTERS MAXIMUM)
COSTS AND BENEFITS IN THOUSANDS OF DOLLARS

ENTER NUMBER OF YEARS IN ANALYSIS PERIOD
10

ENTER FIRST ANALYSIS YEAR
1982

ENTER NUMBER OF DISCOUNT RATES -- 2 DIGITS
 2

ENTER DISCOUNT RATES
3 DIGITS + DECIMAL EACH,  SEPARATED BY BLANKS
  4.  15.

ENTER NUMBER OF BENEFIT TYPES, A BLANK, AND THEN
ENTER NAMES OF UP TO 4 BENEFIT STREAMS-SEPARATED BY BLANKS
EIGHT CHARACTERS PER NAME
4 TRK/USER   BARGE   SALVAGE  PAYROLL

ARE COST AND BENEFIT STREAMS TO BE FACTORED? (YES OR NO)
NO

IS INTERPOLATION REQUIRED FOR COST OR BENEFIT STREAMS?
(YES OR NO)
YES

FOR COST STREAM INTERPOLATION
ENTER NUMBER OF INTERPOLATION PERIODS
IF NO INTERPOLATION REQUIRED-ENTER ZERO
1

ENTER STARTING AND ENDING YEARS OF EACH PERIOD SEPARATED BY BLANKS
1983 1991
```

Terminal

```
FOR BENEFIT STREAM 1 INTERPOLATION
ENTER NUMBER OF INTERPOLATION PERIODS
IF NO INTERPOLATION REQUIRED-ENTER ZERO
1

ENTER BEGINNING AND ENDING YEARS OF EACH PERIOD
SEPARATED BY BLANKS
19783 1991


FOR BENEFIT STREAM 2 INTERPOLATION
ENTER NUMBER OF INTERPOLATION PERIODS
IF NO INTERPOLATION REQUIRED-ENTER ZERO
1

ENTER BEGINNING AND ENDING YEARS OF EACH PERIOD
SEPARATED BY BLANKS
1983 1991


FOR BENEFIT STREAM 3 INTERPOLATION
ENTER NUMBER OF INTERPOLATION PERIODS
IF NO INTERPOLATION REQUIRED-ENTER ZERO
0


FOR BENEFIT STREAM 4 INTERPOLATION
ENTER NUMBER OF INTERPOLATION PERIODS
IF NO INTERPOLATION REQUIRED-ENTER ZERO
1

ENTER BEGINNING AND ENDING YEARS OF EACH PERIOD
SEPARATED BY BLANKS
1983 1985


ENTER YEAR,COST AND APPROPRIATE BENEFIT VALUES SEPARATD BY BLANKS
7 DIGITS + DECIMAL
ENTER 0 FOR YEAR,COST AND BENEFITS TO INDICATE NO MORE DATA
1982 1664.161    0.000    0.000    0.000    0.000
1983 1112.000  633.780  108.292    0.000  250.000
1985    0.000    0.000    0.000    0.000  250.000
1991 1112.000  633.780  108.292 1003.104    0.000
   0
```

MOUNTAIN JUNCTION TO VALLEY - EXAMPLE RUN - 7/13/82
UNION NORTHERN
REHABILITATION
W/O LINE, SHIPPPERS TRUCK TO PLAINTOWN AND LEWISTON - SAWMILL CLOSES DOWN

NET PRESENT VALUE AND BENEFIT/COST RATIO CALCULATION

NUMBER OF YEARS=10 DISCOUNT RATE= 4.0 PERCENT

YEAR	COSTS	PRESENT VALUE	TRK/USER BENEFITS	BARGE BENEFITS	SALVAGE BENEFITS	PAYROLL BENEFITS	TOTAL BENEFITS	PRESENT VALUE
1982	1664.2	1664.2	0.0	0.0	0.0	0.0	0.0	0.0
1983	1112.0	1069.2	633.8	108.3	0.0	250.0	992.1	953.9
1984	1112.0	1028.1	633.8	108.3	0.0	250.0	992.1	917.2
1985	1112.0	988.6	633.8	108.3	0.0	250.0	992.1	881.9
1986	1112.0	950.5	633.8	108.3	0.0	0.0	742.1	634.3
1987	1112.0	914.0	633.8	108.3	0.0	0.0	742.1	609.9
1988	1112.0	878.8	633.8	108.3	0.0	0.0	742.1	586.5
1989	1112.0	845.0	633.8	108.3	0.0	0.0	742.1	563.9
1990	1112.0	812.5	633.8	108.3	0.0	0.0	742.1	542.2
1991	1112.0	781.3	633.8	108.3	1003.1	0.0	1745.2	1226.1
TOT	11672.2	9932.3	5704.0	974.6	1003.1	750.0	8431.8	6916.1

BENEFIT/COST RATIO= .70
NET PRESENT VALUE= -3016.2
COSTS AND BENEFITS IN THOUSANDS OF DOLLARS

MOUNTAIN JUNCTION TO VALLEY - EXAMPLE RUN - 7/13/82
UNION NORTHERN
REHABILITATION
W/O LINE, SHIPPPERS TRUCK TO PLAINTOWN AND LEWISTON - SAWMILL CLOSES DOWN

NET PRESENT VALUE AND BENEFIT/COST RATIO CALCULATION

NUMBER OF YEARS=10 DISCOUNT RATE=15.0 PERCENT

YEAR	COSTS	PRESENT VALUE	TRK/USER BENEFITS	BARGE BENEFITS	SALVAGE BENEFITS	PAYROLL BENEFITS	TOTAL BENEFITS	PRESENT VALUE
1982	1664.2	1664.2	0.0	0.0	0.0	0.0	0.0	0.0
1983	1112.0	967.0	633.8	108.3	0.0	250.0	992.1	862.7
1984	1112.0	840.8	633.8	108.3	0.0	250.0	992.1	750.1
1985	1112.0	731.2	633.8	108.3	0.0	250.0	992.1	652.3
1986	1112.0	635.8	633.8	108.3	0.0	0.0	742.1	424.3
1987	1112.0	552.9	633.8	108.3	0.0	0.0	742.1	368.9
1988	1112.0	480.7	633.8	108.3	0.0	0.0	742.1	320.8
1989	1112.0	418.0	633.8	108.3	0.0	0.0	742.1	279.0
1990	1112.0	363.5	633.8	108.3	0.0	0.0	742.1	242.6
1991	1112.0	316.1	633.8	108.3	1003.1	0.0	1745.2	496.1
TOT	11672.2	6970.2	5704.0	974.6	1003.1	750.0	8431.8	4396.8

BENEFIT/COST RATIO= .63
NET PRESENT VALUE= -2573.4
COSTS AND BENEFITS IN THOUSANDS OF DOLLARS
DO YOU WANT TO GET THE INTERNAL RATE OF RETURN? (YES OR NO)
NO

ARE THERE ANY MORE ANALYSES? (YES OR NO)
NO

Terminal

Sample Input to BENCST

```
TYPE FORT10.DAT
1MOUNTAIN JUNCTION TO VALLEY - EXAMPLE RUN - 7/13/82
2UNION NORTHERN
3REHABILITATION
4W/O LINE, SHIPPPERS TRUCK TO PLAINTOWN AND LEWISTON - SAWMILL CLOSES DOWN
5COSTS AND BENEFITS IN THOUSANDS OF DOLLARS
  10 1982   4   1   0   2 4.0015.00
6TRK/USER  BARGE  SALVAGE PAYROLL
    0 1983 1991    0     0     0     0     0     0
    1 1983 1991    0     0     0     0     0     0
    2 1983 1991    0     0     0     0     0     0
    3    0    0    0     0     0     0     0     0
    4 1983 1985    0     0     0     0     0     0
    5
19821664.161   0.000   0.000   0.000   0.000
19831112.000 633.780 108.292   0.000 250.000
1985   0.000   0.000   0.000   0.000 250.000
19911112.000 633.780 108.2921003.104   0.000
    0   0.000   0.000   0.000   0.000   0.000

A>
```

BENCST

ARE YOU GOING TO USE EXISTING INPUT FILE? (YES OR NO)
YES

Terminal

MOUNTAIN JUNCTION TO VALLEY - EXAMPLE RUN - 7/13/82
UNION NORTHERN
REHABILITATION
W/O LINE, SHIPPPERS TRUCK TO PLAINTOWN AND LEWISTON - SAWMILL CLOSES DOWN

NET PRESENT VALUE AND BENEFIT/COST RATIO CALCULATION

NUMBER OF YEARS=10 DISCOUNT RATE= 4.0 PERCENT

YEAR	COSTS	PRESENT VALUE	TRK/USER BENEFITS	BARGE BENEFITS	SALVAGE BENEFITS	PAYROLL BENEFITS	TOTAL BENEFITS	PRESENT VALUE
1982	1664.2	1664.2	0.0	0.0	0.0	0.0	0.0	0.0
1983	1112.0	1069.2	633.8	108.3	0.0	250.0	992.1	953.9
1984	1112.0	1028.1	633.8	108.3	0.0	250.0	992.1	917.2
1985	1112.0	988.6	633.8	108.3	0.0	250.0	992.1	881.9
1986	1112.0	950.5	633.8	108.3	0.0	0.0	742.1	634.3
1987	1112.0	914.0	633.8	108.3	0.0	0.0	742.1	609.9
1988	1112.0	878.8	633.8	108.3	0.0	0.0	742.1	586.5
1989	1112.0	845.0	633.8	108.3	0.0	0.0	742.1	563.9
1990	1112.0	812.5	633.8	108.3	0.0	0.0	742.1	542.2
1991	1112.0	781.3	633.8	108.3	1003.1	0.0	1745.2	1226.1
TOT	11672.2	9932.3	5704.0	974.6	1003.1	750.0	8431.8	6916.1

BENEFIT/COST RATIO= .70
NET PRESENT VALUE= -3016.2
COSTS AND BENEFITS IN THOUSANDS OF DOLLARS

MOUNTAIN JUNCTION TO VALLEY - EXAMPLE RUN - 7/13/82
UNION NORTHERN
REHABILITATION
W/O LINE, SHIPPPERS TRUCK TO PLAINTOWN AND LEWISTON - SAWMILL CLOSES DOWN

NET PRESENT VALUE AND BENEFIT/COST RATIO CALCULATION

NUMBER OF YEARS=10 DISCOUNT RATE=15.0 PERCENT

YEAR	COSTS	PRESENT VALUE	TRK/USER BENEFITS	BARGE BENEFITS	SALVAGE BENEFITS	PAYROLL BENEFITS	TOTAL BENEFITS	PRESENT VALUE
1982	1664.2	1664.2	0.0	0.0	0.0	0.0	0.0	0.0
1983	1112.0	967.0	633.8	108.3	0.0	250.0	992.1	862.7
1984	1112.0	840.8	633.8	108.3	0.0	250.0	992.1	750.1
1985	1112.0	731.2	633.8	108.3	0.0	250.0	992.1	652.3
1986	1112.0	635.8	633.8	108.3	0.0	0.0	742.1	424.3
1987	1112.0	552.9	633.8	108.3	0.0	0.0	742.1	368.9
1988	1112.0	480.7	633.8	108.3	0.0	0.0	742.1	320.8
1989	1112.0	418.0	633.8	108.3	0.0	0.0	742.1	279.0
1990	1112.0	363.5	633.8	108.3	0.0	0.0	742.1	242.6
1991	1112.0	316.1	633.8	108.3	1003.1	0.0	1745.2	496.1
TOT	11672.2	6970.2	5704.0	974.6	1003.1	750.0	8431.8	4396.8

BENEFIT/COST RATIO= .63
NET PRESENT VALUE= -2573.4
COSTS AND BENEFITS IN THOUSANDS OF DOLLARS
DO YOU WANT TO GET THE INTERNAL RATE OF RETURN? (YES OR NO)
NO

ARE THERE ANY MORE ANALYSES? (YES OR NO)
NO

Terminal

BRANCH LINE EVALUATION PROGRAM

Line : _____ to _____

Date : _____

Line Name						
Year	Railroad Name					
Cost / Gross Ton - Mile	Special Service Cost/Car	Loco Cost / Unit - Mile	Cost/ Train - Mile			
Car-Mile Cost Box-Uneq.	Car-Mile Cost Box-Eq.	Car-Mile Cost Gondola	Car-Mile Cost Open Hopper	Car-Mile Cost Cov. Hopper	Car-Mile Cost Flat	Car-Mile Cost Tank
Car-Day Cost Box-Uneq.	Car-Day Cost Box-Eq.	Car-Day Cost All Other	Switch Cost Box	Switch Cost Other Except Flat	Switch Cost Flat	
Maintenance Cost/Mile	Land Value / Mile	Net Value of Materials	Rate of Return - %	Annual Gross Revenue	Annual Off Branch Cost	
Line Length	Number of Locos.	Tons / Loco	Trains / Week	Number of Stations	Number of Truck Changes	
Commodity Code	Commodity Name	Truck Cost / Ton	Truck Cost / Ton-Mile	Transfer Cost / Ton	Truck Payload	Optional - Use only if columns 33-40 of previous line have a value. Up to 99 changes allowed

65

BRANCH LINE EVALUATION PROGRAM

Line : _____ to _____

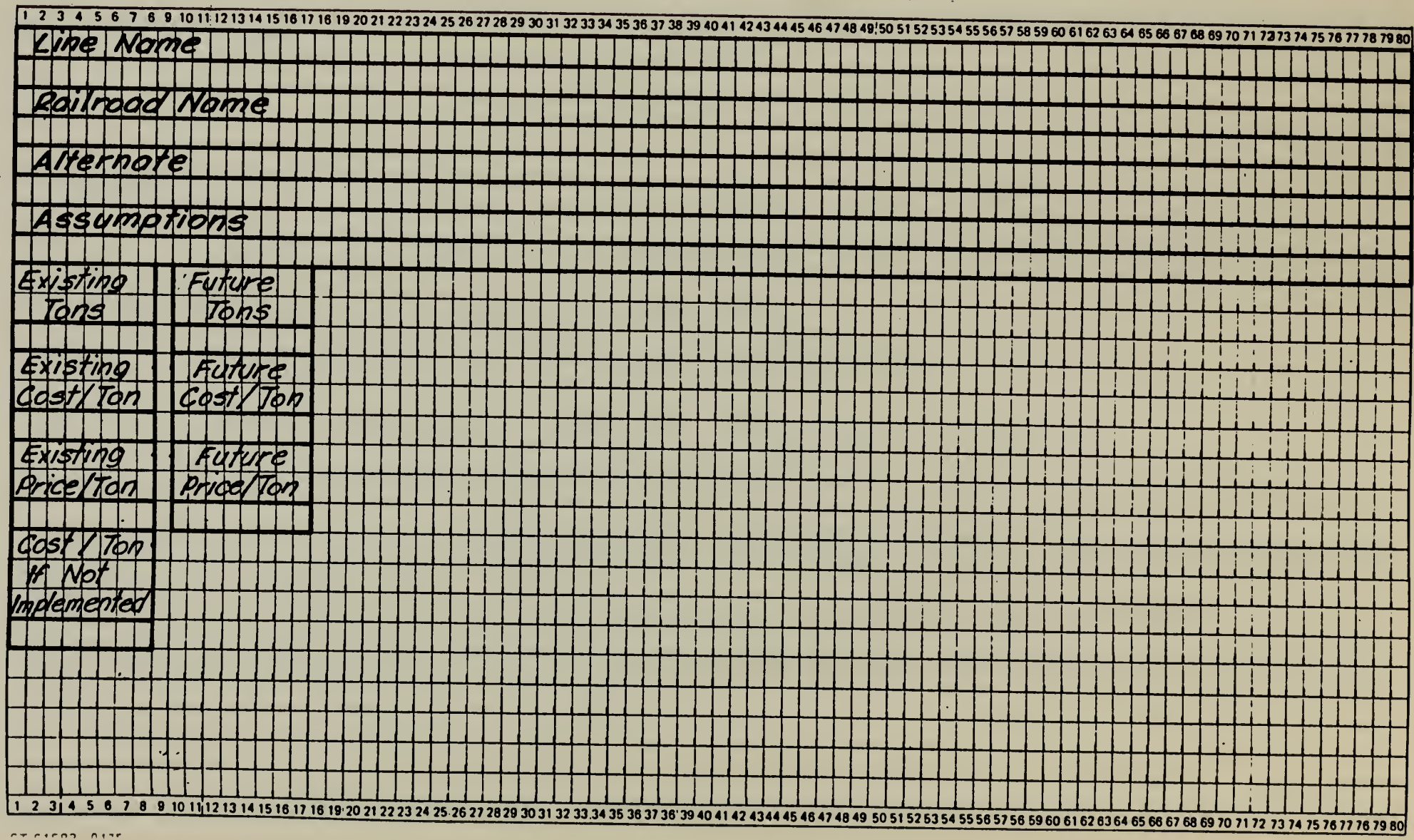
Date : _____

Repeat these five lines for each station

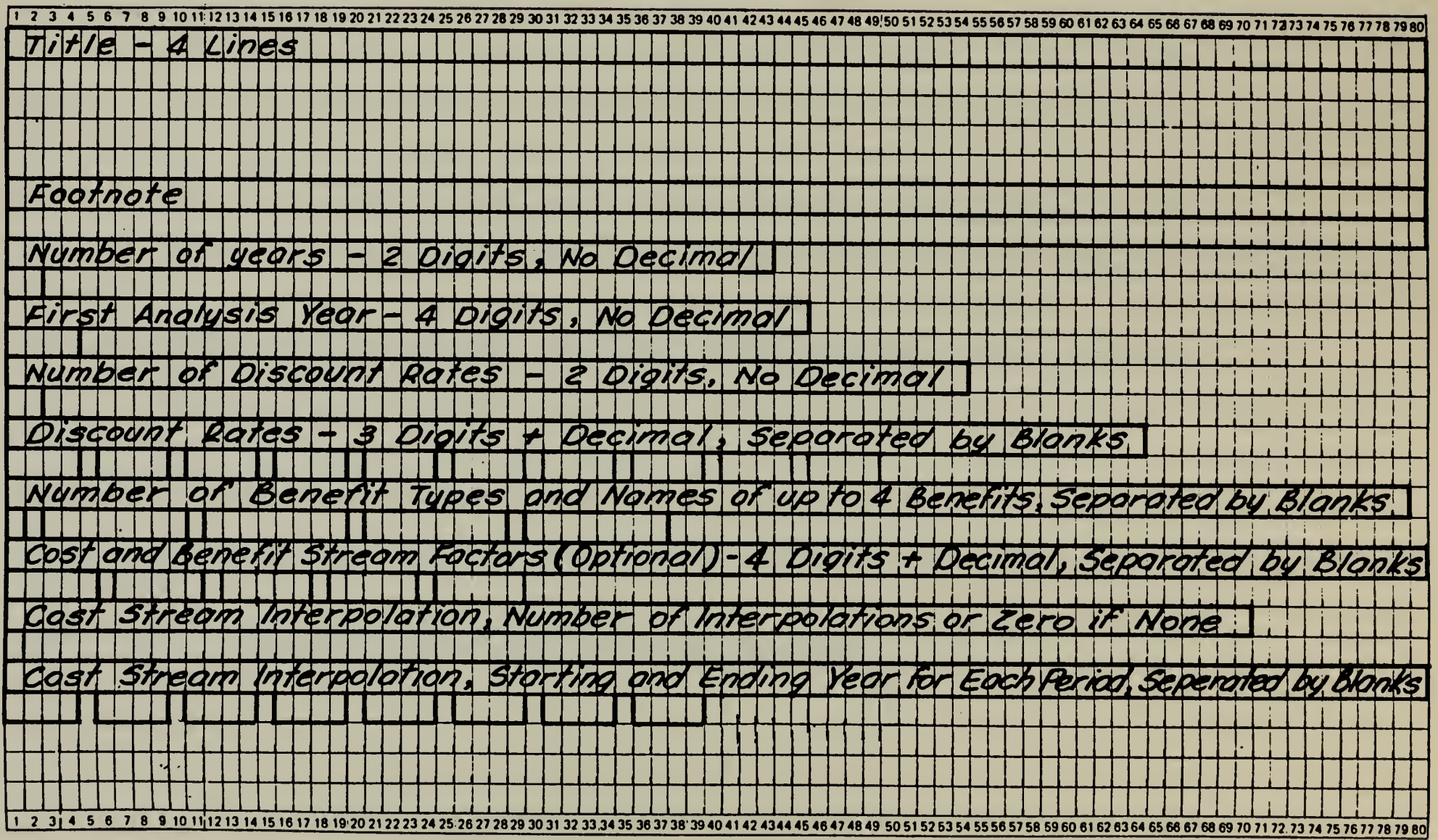
1 2 3 4 5 6 7 8	9 10 11 12 13 14 15 16	17 18 19 20 21 22 23 24	25 26 27 28 29 30 31 32	33 34 35 36 37 38 39 40	41 42 43 44 45 46 47 48 49	50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80
Station Name						
Rail Distance from Junction		Highway Distance to Alt. Station		New Siding Cost		New Platform Cost		New Bulk Facility Cost	
Commodity Code 1		Commodity Code 2		Commodity Code 3		Commodity Code 4		Commodity Code 5	
Car TR-1	Number of Cars-1	Car TR-2	Number of Cars-2	Car TR-3	Number of Cars-3	Car TR-4	Number of Cars-4	Car TR-5	Number of Cars-5
Tons / Car Commodity 1		Tons / Car Commodity 2		Tons / Car Commodity 3		Tons / Car Commodity 4		Tons / Car Commodity 5	
1									
2									
3									
4									
1 2 3 4 5 6 7 8	9 10 11 12 13 14 15 16	17 18 19 20 21 22 23 24	25 26 27 28 29 30 31 32	33 34 35 36 37 38 39 40	41 42 43 44 45 46 47 48 49	50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

99

EFFICIENCY BENEFIT PROGRAM



BENEFIT/COST PROGRAM


Title - 4 Lines
Footnote
Number of years - 2 Digits, No Decimal
First Analysis Year - 4 Digits, No Decimal
Number of Discount Rates - 2 Digits, No Decimal
Discount Rates - 3 Digits + Decimal, Separated by Blanks
Number of Benefit Types and Names of up to 4 Benefits, Separated by Blanks
Cost and Benefit Stream Factors (Optional) - 4 Digits + Decimal, Separated by Blanks
Cost Stream Interpolation, Number of Interpolations or Zero if None
Cost Stream Interpolation, Starting and Ending Year for Each Period, Seperated by Blanks

BENEFIT/COST PROGRAM

Benefit Stream 1 Interpolation, Number of Interpolations or Zero if None

Benefit Stream 1 Interpolation, Starting and Ending Year for Each Period, Separated by Blanks.

Benefit Stream 2 Interpolation, Number of Interpolations or Zero if None

Benefit Stream 2 Interpolation, Starting and Ending Year for Each Period, Separated by Blanks.

Benefit Stream 3 Interpolation, Number of Interpolations or Zero if None

Benefit Stream 3 Interpolation, Starting and Ending Year for Each Period, Separated by Blanks.

Benefit Stream 4 Interpolation, Number of Interpolations or Zero if None

Benefit Stream 4 Interpolation, Starting and Ending Year for Each Period, Separated by Blanks.

Year	Cost	Benefit 1	Benefit 2	Benefit 3	Benefit 4

OFF-BRANCH COSTS

LINE:
RAILROAD:
YEAR:
JUNCTION:
TRAIN TYPE:

LINE NO.	DATA ITEM	O/D 1	O/D 2	O/D 3	O/D 4	O/D 5	TOTAL
1	Input Data						
	Origin/Destination Off-Branch						
	Cars by Type:						
2	Type 1						
3	Type 2						
	Total Tons by Car Type:						
4	Type 1						
5	Type 2						
6	Off-Branch Miles						
	Line Haul Costs						
	Cost/Car-Mile by Car Type:						
7	Type 1	$	$	$	$	$	$
8	Type 2	$	$	$	$	$	$
	Total Car-Mile Cost:						
9	Type 1 (L2xL8xL9)	$	$	$	$	$	$
10	Type 2 (L3xL8xL10)	$	$	$	$	$	$
	Cost/CWT Mile by Car Type:						
11	Type 1	$	$	$	$	$	$
12	Type 2	$	$	$	$	$	$
	Total CWT-Mile Cost:						
13	Type 1 (20xL5xL8xL15)	$	$	$	$	$	$
14	Type 2 (20xL6xL8xL16)	$	$	$	$	$	$
15	Total Line Haul Cost	$	$	$	$	$	$
	Terminal Costs						
	Cost/Car:						
16	Type 1	$	$	$	$	$	$
17	Type 2	$	$	$	$	$	$
	Total Car Cost:						
18	Type 1 (L2xL16)	$	$	$	$	$	$
19	Type 2 (L3xL17)	$	$	$	$	$	$
	Cost/CWT:						
20	Type 1	$	$	$	$	$	$
21	Type 2	$	$	$	$	$	$
	Total CWT Cost:						
22	Type 1 (0.9x20xL4xL20)	$	$	$	$	$	$
23	Type 2 (0.9x20xL5xL21)	$	$	$	$	$	$
24	Total Terminal Cost	$	$	$	$	$	$
25	Total Off-Branch Cost	$	$	$	$	$	$